Telephony The Journal of the Telephone Industry

Volume 116 JANUARY 28, 1939 Number 4

Overcoming Sales Resistance

By B. C. SCHWEITZER

Commercial Superintendent, Home Telephone & Telegraph Co., Fort Wayne, Ind.

INTELLIGENT SALES EFFORTS will produce results if the company can boast (1) a high quality of service, (2) reasonable rates and (3) good public relations built up through a considerate company policy and advertising. Suggestions are offered for overcoming the prospect's sales resistance. Address given before conference of Class A and B member companies of United States Independent Telephone Association

"Our most successful appeals in overcoming resistance in selling or reselling prospects or subscribers residence service," says Mr. Schweitzer, "are (1) the use of the telephone in saving money and (2) the opportunity it provides in finding or obtaining employment."

SINCE the telephone industry became conscious that selling our service rather than taking *orders for it* is and should be a vital part of our business, consciously or unconsciously we have been fighting a battle of overcoming sales resistance.

There is, I believe, a general and widespread understanding of the meaning of "sales resistance," for it is an expression as American as "swing music" or "blessed event." It entered our vocabularies following the era when this country was a "seller's market" with all the accent on production. It became every-day usage when productive capacity increased so rapidly that all emphasis was placed on selling.

Today, producers apply the term "sales resistance" to almost every barrier in the way of profits. Thousands of advertising and sales experts train their inventive minds upon it daily to provide a barrage or counter attack for the advance of products to market. It has, in fact, been the subject of so much study that the average producer has reduced it to the certainty of a mathematical formula. Only recently I saw "sales resistance" expressed in a formula something like this:

$$\text{What the Customer } \textit{wants} - \text{What the Producer } \textit{Thinks} \text{ the Customer wants} = \text{Sales Resistance}$$

The general idea, of course, followed by these producers is to make the product equal to what the customer wants and in that way definitely reduce "sales resistance" to zero.

There is considerable to be said of the necessity for those of us in the telephone business to be interested at all times in what the customer or subscriber to our service wants; but I doubt the need for setting up any equation or formula that we may determine with mathematical precision the resistance to our efforts to sell. We should, however, be alert and appreciative at all times of this evidence which is all about us.

We have a definite advantage in that we are meeting and seeing our customers, not just at the point of sale but month in and month out as our service to them continues. We can even, as some companies do, record and tabulate our customers' opinions of us and our service as expressed in face-to-face and telephone contacts.

Although we are interested today in how resistance to the sale of our services can be analyzed and estimated, above all we must first set the stage, so to speak, in our community that our efforts to sell our services may flourish under the encouragement of subscribers' and community good will.

Speaking broadly, I would list three important conditions as necessary in providing a favorable atmosphere for the addition of revenue

dollars in return for our telephone services. No formula is involved, but the simple addition of these conditions can not help add up to a market where intelligent sales efforts will produce results. First of all I would call attention to a high quality of service; second, to reasonableness of rates; and third, to good public relations through a considerate company policy and advertising.

The first two conditions, I think you will agree, may be accepted without discussion. The third has been chosen for a few remarks.

Friendly Relations Essential Between Company, Community

The necessity for a friendly relationship between the company and community can not be over-emphasized. The telephone company should at all times be at the service of the community. It should be eager and ready to cooperate closely with civic, service and social organizations.

Employes should be encouraged to participate in civic affairs and, where opportunities naturally present themselves, exhibits and demonstrations of telephone equipment and speaking engagements should be arranged; the conducting of "open house" programs, tours through our buildings and, where possible, rural broadcasts over farm lines in an effort to make our relationship with the community more real and helpful.

Newcomers to your communities, as well as new subscribers to our service, should be welcomed by letter or folder.

Cooperation with all newspaper publishers in the area served by the company pays big dividends, especially when they can be relied upon to serve as confidential advisers, keeping us informed as to how the public likes or dislikes our service.

With this relationship existing—to point out a specific example—at our suggestion one of our Fort Wayne newspapers has just reprinted a four-page folder entitled "Telephone Numbers in Advertisements Increase Business" to be inserted with our monthly bills to all business users. This cooperation brings three-fold results: aiding the business telephone user, the newspaper and the telephone company.

At all times it is our duty to assist our subscribers in using their service to the best advantage so that they will appreciate the indispensability of the service and have a desire to increase their telephone facilities whenever an advantage can be shown. In that connection, individual booklets or a series of pamphlets for residence and business subscribers, designed especially to aid them in their use of telephone service—may be distributed.

We should try in every way we can to *know* our fellow citizens and our subscribers and to maintain a friendly attitude in rendering our service to them. We should regard as particularly important in the maintenance of this attitude a reasonable and consistent collection policy.

Advertising, in addition to conveying sales messages, should include informative, friendly copy whenever the occasion presents itself to tie the company together with the community by reference or tribute to a civic program at hand as, for example, letting the public know what your company is doing to avert traffic accidents whenever a safety program is in progress.

Because of the condition of general business throughout the country at this time, it seems safe to say that the strongest resistance to the sale of telephone service now being encountered is based upon a claim of inability to afford. This type of resistance is, perhaps, being met in all efforts to sell whether directed toward residence or business prospects.

From our experience, I thought I might offer you some ideas relative to overcoming this resistance with the hope that perhaps one of them will be worthy of your consideration.

We are trying, first of all, to prepare ourselves for all contacts with subscribers or prospects for service; whether they are being approached in an effort to sell service or whether they approach us with the idea of moving, changing, reducing or ordering their service out. We are even following through with contacts where service has been ordered out, in a final effort to save the station and revenue.

Our most successful appeals in overcoming resistance in selling or reselling prospects or subscribers residence service are (1) the use of the telephone in saving money and (2) the opportunity it provides in finding or obtaining employment.

It can be shown, for example, that the telephone saves carfare, reduces the cost of automobile operations, lessens the cost of medical advice, permits advantage to be taken of special sale prices and eliminates the necessity for pay-station calls.

In the appeal based upon the aid of the telephone in finding employment, it can be shown how some employers and agencies, including state employment agencies, first call people who can be reached by telephone —and how friends can call if they hear of jobs.

It also can be shown how the telephone aids in obtaining part time or additional employment—such as painting, carpentry, housework, gardening, nursing, care of children, dressmaking, selling home-made products, etc. Also it helps some men, such as salesmen, to increase their business.

Our experience has been that much of resistance to the sale of additional service, or the retention of present service by business subscribers, is the result of their lack of understanding of how important telephone service is to their business, and how much it means in the efficiency and the economy of their operations.

Traffic meter studies showing the lost calls and the total calls, observation of the business premises, and interviews with people in the business organization aid greatly in equipping us to recommend just what the subscribers' needs for service may be.

Central office lines, stations, wiring plans, PBX's and even PABX's, are often sold, and frequently saved, by careful analysis of the needs before the discussion of telephone service with the business subscriber is completed.

Objections to the cost of any telephone equipment can usually be met and overcome if that cost is reduced to the rate per day and the customer shown the impossibility of any worker at a comparable daily wage providing the same increased efficiency for the organization.

Business Men Welcome Education on the Telephone

We have been greatly pleased by the receptiveness of business men to this program of education in the importance of telephone service to their organizations. To illustrate: One president of a large manufacturing company told us, after contracting for the sale of a PABX, that he would save more than the cost of the equipment by its tendency to keep men at their desks. He was referring, of course, to that feature of the equipment which permits quick intercommunication by telephone between desks and departments.

We have also found business men very receptive to the modern appearance of the handset and generally very interested in any equipment, such as wiring plans, which will save their employes' time.

In conclusion, I would like to call your attention to two developments of recent months which pertain particularly to the farmer, both of which may prove to be of very definite aid

in the overcoming of sales resistance.

The first is the increasing realization on the part of the rural subscriber or prospect of the cost of furnishing him telephone service. This new appreciation can be traced directly to his experience with the rural electrification program. While we in the telephone business may be suffering somewhat at the inauguration of this program, it would seem now that eventual benefits may result from this new knowledge acquired by the farmer.

Finally, another development for which we are all appreciative and grateful to the United States Independent Telephone Association and its special committee—is the 10 per cent reduction in many states and under certain conditions in fire insurance rates for farmers who have telephones in their rural dwellings.

There are now 17 states which have this rate reduction in effect; and the necessity for having a telephone in the home to obtain this rate can only result in an aid to us in overcoming sales resistance in rural areas.

▼ ▼

Ohio Bell to Spend Large Sum for Expansion

The Ohio Bell Telephone Co. will spend about 14 million dollars on expansion and replacement of facilities throughout the greater part of the state this year, according to Randolph Eide, of Cleveland, the company's president.

Mr. Eide said the company is basing its program of expansion on an estimate that 35,000 telephones will be added to the system in Ohio this year. This will be considerably better than the 1938 gain, but only about half that of 1937.

▼ ▼

Pioneer Association Offers "Employment Assistance"

Widening its scope of activities in a direction to make itself of more value to its membership, the Independent Pioneer Telephone Association of the United States is offering "employment assistance" to members not presently employed. The decision to establish a department of employment assistance was reached last fall by the officers and executive committee of the association and a committee has since worked out the details of the plan.

Unemployed Pioneers desiring to avail themselves of their association's "employment assistance" will be requested to fill out a form to give a brief outline of their experience, qualifications and general fitness. The employment assistance application form may be obtained from the office of the Secretary, J. K. Johnston, 632 Lemcke Building, Indianapolis, Ind.

With this information on file, the officers of the Independent Pioneer association will present the applicants' qualifications to executives of the Independent companies who might have an opening which unemployed Pioneers are qualified to fill.

There are bonds of fellowship and friendship between members of the Independent Pioneer association developed as a result of contacts and experiences throughout the years in the same industry. Hence, when an Independent Pioneer is without a position, he is quite certain to receive special consideration from fellow members in efforts to place him again in telephone employment for which he is qualified.

The cooperation of every telephone executive in making this new activity of the Independent Pioneer association a success will be appreciated.

In addition to this new activity in behalf of its members, a special association committee has been appointed to investigate other plans for making the association of still greater service to the telephone industry.

▼ ▼

Joint Wisconsin Convention Is Scheduled for June

The joint convention of the Wisconsin State Telephone Association and the Wisconsin Locally Owned Telephone Group will be held June 13, 14 and 15 at the Park Hotel, Madison.

WAGE-HOUR PROBLEM PRESENTED TO WASHINGTON OFFICIALS

MEMBERS of the wage and hour committee of United States Independent Telephone Association have been in Washington, D.C., for the past ten days or so, representing, under the direction of John H. Agee, chairman of the committee, the association in matters connected with the Wage-Hour law and its application to telephone exchanges.

The committee has been assisted in this work by B. L. Fisher, president of the association, who has also been in Washington and by A. L. Geiger, counsel for the association. The committee members who went to Washington are Chairman Agee, Vice-Chairman E. C. Blomeyer, J. F. O'Connell and W. C. Henry.

The committee reports that there has now been discussed with a number of members of the Senate and House of Representatives the question of the impossibility of a large number of small Independent exchanges meeting the requirements of the Wage-Hour law. These legislators, on the whole, have been sympathetic with the position of the Independent exchanges and, in most cases, have offered to be of assistance to the industry in getting the matter straightened out.

The committee has also discussed the question quite fully with Elmer F. Andrews, administrator of the Wage-Hour Division. Mr. Andrews and his staff are conversant with the situation and the committee feels that they are also interested in finding a practicable method of relieving these exchanges of an impossible burden. The question seems to be at present whether such a method can be found legally under the law as it now stands.

The committee has in mind that if it develops that, under present law, relief cannot be given these small exchanges then the committee will attempt to obtain an amendment to the Act.

It is felt, however, that it may be very difficult to obtain an amendment to this Act during the present session of Congress. There will undoubtedly be considerable reluctance to amend so soon after its passage a law which has now been in effect only a few months.

The committee is understood to feel that it needs the assistance from the field of every telephone exchange affected by the law—if telephone exchanges are really subject to the law. It is still the association's position that telephone exchanges are exempt under Section 13(a)(2) of the law, as service establishments, when the greater part of their business is intrastate. The Administrator, however, has ruled that telephone exchanges are not service establishments and, therefore, that they are not exempt under this section of the Act.

The committee has issued a general request to the owners of all exchanges affected to immediately notify their Senators and Representatives in Congress about this situation, either by letter or telegram. It is felt that if the situation is made known to all members of Congress the proposition of obtaining an amendment, if that should be necessary, will be greatly simplified.

The committee expects to continue its activities in Washington until some definite position is reached.

In the Nation's Capital

By FRANCIS X. WELCH

Special Washington, D. C., Correspondent for TELEPHONY

TESTIMONY ON PATENTS and "directed research" before Senator O'Mahoney's monopoly investigating committee brings out interesting information. . . . Dr. Jewett, president of Bell Telephone Laboratories, Inc., tells of directed research of that organization in the interest of the telephone industry in general and of the Bell System in particular. . . . Independent manufacturing companies highly complimented by Dr. Jewett. . . . Notes on FCC and government-spending.

LAST WEEK was "Patent Week" before Senator O'Mahoney's Temporary National Economic Committee, and much was said there of interest to the telephone industry. Conway P. Coe, U. S. Commissioner of Patents, led off with an explanation and defense of the American patent system as developed by his bureau (although he did recommend a few legislative improvements.)

Of principal interest to telephone men was the testimony of the next witness, Dr. Frank B. Jewett, head of Bell Telephone Laboratories, Inc. Then there was the precocious Philo T. Farnsworth, who told the committee how, when a mere lad of fourteen, he had stumbled upon the basic principle of television. George Baekeland, head of the Bakelite corporation, told the committee how the art of plastic moulding has come along so well that it is now possible to cast stronger, lighter airplane bodies, all in practically one piece, using only nine men and two hours for the operation.

But to get back to Dr. Jewett, it is not too much to say that his testimony, more than that of any of the other witnesses, touched the fundamental question of "directed research," which the committee was really driving at. The fact that this basic question arose during a discussion of patents is only a detail or, at least, a method of approach. One might also approach from a sociological angle, or from a financial angle, or even a politico-economic angle. Any way you go about it, this question ultimately emerges:

"Is it better to let our big industries expand their own research facilities directed to their own business objectives, or should laboratory science be liberated (by statute or by any other device) to go where it pleases, do what it will and dig up what happens to come along?"

Of course, right away the thought crosses one's mind that this is a moot question because there is no restriction in this free country of ours against anybody doing what he pleases in his own laboratory. But a moment's reflection, however, prompts the second thought that the problem of pursuing free scientific inquiry is not as simple as all that.

First of all, scientists have to eat like the rest of us. Then there is the important item of equipment. This is becoming so expensive in modern experiments along almost any line you can name that only the business corporation with reserves drawn from established commercial operation can afford to outfit the scientist.

Then there is the problem of applying an invention or discovery, once it is perfected, assuming that despite these financial handicaps an independent inventor has developed something worth while. If it does not exactly suit established business management — if, indeed (as occasionally happens), the new discovery threatens violent disruption to the established business technique—the established business won't touch it with a 10-foot pole.

Or, to go back to the specific patent angle, established business may buy up the patent of the new device and proceed to suppress it. Or, if it cannot buy up the inventor's patent, it will acquire other patents surrounding it, and harass the inventor with litigation until he does sell his brain child into the imprisonment of a pigeon hole.

THAT IS the case against organized "directed research." Following this line of reasoning we arrive at the paradox that while only the rich (corporation) can afford independent large-scale research, it is this very class which refuses to support independent large-scale research. But that is a biased picture.

There is another side to the story —a side that was portrayed remarkably well by Dr. Jewett in his testimony before the O'Mahoney committee. Dr. Jewett admitted right off the bat that Bell Telephone Laboratories, Inc., is a "directed" research department—directed entirely in the interest of the telephone industry in general, and for the Bell System in particular.

This means that all research which goes on in these laboratories is subordinate to the principal objective of improving the effectiveness of telephone service to the public.

This does not mean that Bell experts do not go far afield. Indeed, they seem to fool around with items which apparently have only a remote connection to the business of providing telephone service. Best evidence of this is the list of Bell patents which includes patents covering features of musical instruments, moving picture equipment, acoustical decorations, mechanical aids for hearing, and others which Dr. Jewett himself described as "trivial."

By and large, however, the Bell Telephone Laboratories have stuck to the indicated line of research. Out of some 15,000 patents, Dr. Jewett pointed out that only about 2,000 were for non-communications devices. He went on to explain the Bell practice of leasing out these by-products to other organizations better equipped to market them. In this respect, he said, the manufacturing department of the Bell System—Western Electric—has gone even further, deliberately divorcing itself from a number of profitable by-paths into the field of electric appliance manufacture and so forth.

But what Assistant Secretary of Commerce Patterson wanted to know was: Why were the Bell laboratories ever started in the first place? The electric utilities, the gas utilities, railroads, and so forth, have developed without having any central research organization of such proportions, and these industries all involve more of a capital investment than the Bell System.

Dr. Jewett's testimony was prepared along that line. The Bell laboratories, he said, grew out of the original objective of the founding fathers of the Bell System way back before the turn of the century—to make it possible for anybody in the United States to talk to anybody else in the United States.

Driving along straight towards the objective, he said, the Bell executives soon realized that the only way they could control the *quality* and *specific application* of necessary supplies to the telephone business was to develop research and manufacturing devices of their own. It was a sort of "industrial self-sufficiency"—without involving, of course, the economic chauvinism, which characterizes the nationalistic self-sufficiency programs of certain dictatorship nations today.

In other words, the Bell was perfectly agreeable to buying all raw materials for other services. It had no desire to develop an industrial empire, *per se*, as some other industries have been tempted to do. It bought no coal mines, nor copper mines, nor timber forests, nor tropical rubber plantations. The products of these things the Bell was satisfied to buy in the open market.

IT WAS only when the *fabrication* of equipment had a special and precise bearing upon the efficiency of telephone service that the Bell felt it necessary to be "master of its own house"—to use Dr. Jewett's expression.

He exemplified this very well by referring to the improvement of the telephone repeater tube (and provoked, as a result, a minor barrage of questioning from the curious committeemen). The telephone repeater tube developed in the early 1920's had a life of only 1,000 hours. It was a costly item in long distance service and an unsatisfactory one, aside from the expense, because of the loss of service efficiency resulting from periodic tube failures.

Now, said Dr. Jewett, if the Bell had been obliged to go out into the open market and buy its tubes, it would have had a hard time convincing the average radio tube manufacturer that the latter should spend speculative funds in research designed to obtain a longer life tube. Indeed, because of the profit motive involved in keeping up a volume of sales so as to sustain production, the average radio tube manufacturer might well feel that such a line of inquiry was against its own self-interest.

But by freeing its own research organization from such a profit motive, and substituting "service" as the driving incentive, Bell obtained from its own laboratories a repeater tube averaging 50,000 life hours. This improvement, he said, has possibly saved telephone users as much as $10,000,000 a year by resulting operating economies.

At this point, Dr. Isador Lubin, head of the U. S. Bureau of Labor Statistics, wanted to know why, if the Bell had such a swell tube, it did not give the radio receiving set the benefit of it. Dr. Jewett replied that by very reason of the fact that the Bell tube was designed for quality rather than low cost, the radio receiving set industry would probably not find the Bell improvement very practicable. In other words, for an ordinary receiving set, the Bell tubes would be "over-engineered." It would take the average radio fan 40 years to burn out his tubes; and who wants a radio set 40 years in this day and age?

Responding to a question by Commissioner Davis of the FTC, Dr. Jewett said that he believed these long-life tubes were available to the Independent telephone companies. He added, however, that although the Independents render a great portion of the local telephone service of the nation, there were few of them which operate long distance circuits of any great mileage. So for the Independent telephone companies, as a whole, the long distance repeater tube was not such an important item as it was for the Bell which carries on the bulk of the long lines business for both Bell and Independents.

IT WAS at this point that Dr. Jewett paid high compliment to the work of the Independent telephone manufacturing companies. He mentioned Stromberg-Carlson, Automatic Electric, and Kellogg Switch-

COMING CONVENTIONS

Texas Telephone Association, Baker Hotel, Dallas, March 22, 23 and 24.

Oklahoma Telephone Association, Huckins Hotel, Oklahoma City, March 27 and 28.

Kansas Telephone Association, Municipal Auditorium, Junction City, March 30 and 31.

Missouri Telephone Association, Hotel Muehlebach, Kansas City, April 3 and 4.

Nebraska Telephone Association, Lincoln Hotel, Lincoln, April 11 and 12.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, April 18, 19 and 20.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 25 and 26.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 10 and 11.

New York State Telephone Association, Hotel Syracuse, Syracuse, May 23, 24, 25 and 26.

The Illinois Telephone Association, Pere-Marquette Hotel, Peoria, June 7 and 8.

Wisconsin State Telephone Association and Wisconsin Locally Owned Telephone Group, Park Hotel, Madison, June 13, 14 and 15.

board by name as having achieved many important telephone improvements, entirely apart from the Bell patents.

It was obvious that he recognized the importance of having these Independent companies continue and flourish so as to keep the telephone manufacturing industry as a whole "on its toes"—and to guard against the inertia which can come even to a high-powered organization like the Bell when it becomes conscious of an absolute monopoly. He referred to this angle obliquely when he recalled that the British Post Office, which operates a telephone monopoly in Great Britain, was attracted to the efficiency of American telephone methods.

Finally, Dr. Jewett touched upon the most human and, perhaps, the most important phase of all — the role of the individual and independent researcher. Was there any place left for him in the science picture of today?

It should be comforting to those who are wondering about this question, that Dr. Jewett, head of what is perhaps the largest "directed research" laboratory in the world, feels that the opportunities of the independent researcher are increasing. Big laboratories, he said, do their most valuable work in perfecting and working out detailed application for basic principles, which are often discovered by individual research scientists.

In the telephone industry, for example, two of the three "key inventions" of the last 25 years named by Dr. Jewett came from outside of the Bell Laboratories. One was the loading coil, perfected by Michael Pupin; the other, the De Forrest vacuum tube. The Bell blue ribbon exhibit was the wave filter developed by Bell's George A. Campbell.

Other witnesses before the O'Mahoney committee gave the same general picture. It is often the small independent who discovers the fundamental principles of a great new discovery. It is "directed research" which adopts these principles to a specific industry.

It is the prevailing fashion among historical writers to say that the day of the "empirical type" inventor is past. Such comments are frequently followed with observations to the effect that Thomas Edison was perhaps the last of the great and important researchers who spurned scientific formula and so often approached a laboratory task with little else than a preconceived idea.

IT IS TRUE enough that the trend in modern laboratory technique is definitely away from the trial-and-error methods of Edison and toward the "directed research" of highly-specialized institutions such as the Bell Laboratories and the Mellon Institute. Bit by bit, the new generation of experiments seems to be taking the element of chance and fluke out of technical research. Some enthusiastic scientists even claim that discoveries and inventions can now be planned and regulated, along certain industrial lines at least, just like an advertising program or a selling campaign.

And so, when we watch the modern mining engineers go to work discovering mineral deposits with the latest electro-geophysical gadgets and compare them with the peach-twig well-finders of our grandfather's day, it does seem the old romantic hit-or-miss era in research is one more victim of the machine age with its Great God Formula.

Reflecting upon the life of Thomas A. Edison does much to revive our faith in the romantic realists who go down to the laboratories to play hunches. This is not to suggest that Edison ever dreamed of any substitute for hard work in the business of invention. After all, he only practiced what he preached when he made his famous remark about "one per cent inspiration and 99 per cent perspiration."

But Edison, for all his accomplishments, was certainly unorthodox in his methods and unscientific in his background. Furthermore, he was proud of it and very blunt in his contempt for the mathematicians. Edison's respect for the intricacies of accountants and their balance sheets was even more meager. Edison admitted that he was no scientist—just an inventor. He saw no essential relationship between the two, as much as he respected Faraday whom he regarded as a real scientist.

Busy as he was with numerous important objectives, yet he hated to pass over the slightest unexplained phenomenon which his uncanny powers of perception would detect. Thus it was that in the midst of the pressure of getting his lighting bulb and central power station business started, Edison found time to "monkey with" his incandescent bulb models to the extent of noting the odd "Edison effect," which eventually led to the discovery of the radio tube.

Edison dutifully catalogued the "Edison effect" and laid it aside for further attention, which he never quite got around to. If he had, perhaps, radio and television would have been born around the turn of the twentieth century instead of waiting for De Forrest, Baird, and the others.

THE FCC was finally examined early this week (January 23) by the House appropriations subcommittee on its request for a $2,038,175 budget for the coming year. Nobody knows exactly what took place, outside of the committeemen and those who attended on behalf of the FCC—who included Chairman McNinch and Acting General Counsel Dempsey.

The proceedings of the hearing, however, will be made public when the final appropriations bill is presented on the floor of the House of Representatives. It had generally been expected that Chairman McNinch would undergo some rather sharp questioning because of the upheavals which have occurred during the past year in the FCC personnel at his instigation.

THE GENERAL press has been waking up to the economic dangers of the Eccles spend-spend-spend program which President Roosevelt has apparently adopted without reservation (discussed in this department two weeks ago.) However, one recent and little noted development which may be of special interest to the utilities—notably the electric industry—is the movement on foot by some of the New Deal sharpsters to make the Treasury books look better by writing up government spending under the euphonious label of "government investment."

Of course, it is possible for a government to make an investment, as well as a private individual, and there is no reason why such an investment should not appear on the government's books as an asset.

However, government spending in public works, such as a new highway, while perhaps an "investment in social values," is hardly an investment in the sense of a financial asset which could be liquidated at substantial value.

The SEC would never permit a private company to record such an asset on a stock registration declaration. What may interest utilities is the idea of writing up the overall cost of some of these combined power-flood control-irrigation and navigation projects as assets on the credit side of the Treasury ledger. We shall hear more about this as the session progresses.

The Wage-Hour Plight of Subscribers of Small Exchanges

THE PLIGHT of small telephone exchanges and of the employes of small exchanges, if the national Wage-Hour Law applies to such exchanges, have been discussed in preceding issues of TELEPHONY. The wage-hour plight of the subscribers of such exchanges is, however, more important from a public standpoint than the situation of either the exchanges or their people.

As pointed out in our preceding discussions, if the national Wage-Hour Law (the correct name is "Fair Labor Standards Act of 1938") applies to small telephone exchanges, a large number of them can continue to exist under their present methods of operation only provided they can make effective a very substantial increase in their rates for service, or can very substantially reduce their present expenses. In many cases they would need to do both.

The Administrator of the Wage-Hour Law, in Washington, has recently held that the law applies to all telephone exchanges, notwithstanding the fact that service establishments are exempt under the law if their business is mostly intrastate. The business of the small telephone exchange is, in most cases, almost entirely intrastate.

In a preceding issue (January 21) we have shown the effect that application of this law would have upon 914 Independent exchanges, out of some thousands of them that are now in operation. (The 914 were all of this particular size that data was available upon at the time, but they are typical of the whole.) The average exchange of this size—operating up to 250 telephones—does not take in enough money to meet the first stage of wages required by the law. It would be hopelessly "in the red," even before the succeeding and higher rates of wages became effective under the law.

These figures came from the United States Independent Telephone Association. That association has also been making studies of the effect of this law upon larger Independent exchanges. It has found that, as to 695 typical exchanges operating from 251 to 500 telephones, the average exchange of this size would be "in the red" when the 30 cents per hour becomes effective next October; and would operate at a serious loss when the final stage of the act becomes effective.

A majority of the exchanges of this size would begin to lose money as soon as the first stage of the law —that is, a minimum of 25 cents per hour—begins to apply to all their employes.

As to larger Independent exchanges—those of from 501 to 1,000 telephones—they will, according to the association's data, also be seriously hit by the application of the law. Even exchanges of from 1,001 to 2,500 telephones each will, in a number of cases, have their earnings so seriously reduced that they cannot meet their fixed obligations.

If this law is applied to these Independent telephone exchanges, it is obvious that they cannot supply, under their present rates, the amount, type and kind of service they are now furnishing their subscribers. They must have higher rates, or they must curtail their service—in many cases they must do both.

In either event the service rendered the public will be curtailed, because higher rates at most of these places will naturally mean the loss of many telephones; and, consequently, fewer people will have the advantage of telephone service and can be reached by telephone.

This is what the application of the national Wage-Hour Law means to the subscribers of many of these exchanges—less service at higher rates.

It is inconceivable that the Congress of the United States meant such a thing to happen—especially since the telephone subscribers concerned are so largely farm subscribers. It is a fair assumption, it seems to us, that this law was never intended to apply to telephone exchanges. The Administrator of the law, in Washington, has, however, decided that telephone exchanges are not exempt.

The wage and hour committee of the United States Independent Telephone Association is now in Washington, attempting to obtain either a ruling of the Administrator, or an amendment to the law, exempting these Independent exchanges. Every telephone company affected should lose no time in advising its subscribers, its local civic authorities, its state public service commission, and the members of Congress representing it, just what this situation will do to the subscribers of these Independent telephone exchanges.

Mathematics for Telephone Engineers

By H. H. HARRISON, M. Eng., M. I. E. E.

ARTICLE NINE, Section 2, of this mathematics series, continues the discussion of differential equations and their application to the solution of problems relating to electric circuits

THE FUNCTION $y = A \sin wt$ is produced by the motion of a vector of length A rotating with the angular velocity w radians per section. $y = A \sin (wt + \epsilon)$ is the same function except that the initial position of the vector is ϵ radians in advance of its former position.

The expression $A \sin (wt + \epsilon)$ can be changed into the two-term expression, $a \sin wt + b \cos wt$, if values of A and ϵ are fixed in terms of a and b so that $A \sin (wt + \epsilon)$ is equal to $a \sin wt + b \cos wt$.

By the addition formula, $\text{Sin } (A + B) = \sin A \cdot \cos B + \cos A \cdot \sin B$.

Replacing A by wt and B by ϵ,

$$\text{Sin } (wt + \epsilon) = \sin wt \cdot \cos \epsilon + \cos wt \cdot \sin \epsilon.$$

Multiplying throughout by A,

$$A (\sin wt + \epsilon) = A \sin wt \cdot \cos \epsilon + A \cos wt \cdot \sin \epsilon.$$

For $A (\sin wt + \epsilon)$ to be equal to

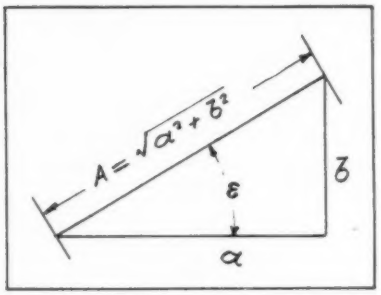


Fig. 220. Determination of hypotenuse from sides of a triangle.

$(a \sin wt + b \cos wt)$, $A \sin wt \cdot \cos \epsilon = a \sin wt$, and $A \cos wt \cdot \sin \epsilon = b \cos wt$.

Therefore, $A \cos \epsilon = a$ and $A \sin \epsilon = b$.

Therefore, $\cos \epsilon = a/A$ and $\sin \epsilon = b/A$.

Fig. 220 is a triangle, the horizontal and vertical sides of which are a and b, respectively, and $\tan \epsilon = b/a$. With a and b known, ϵ is found from a table of tangents. Also $A = \sqrt{a^2 + b^2}$.

2. If the voltage in an electric circuit is V, the current i amperes, the resistance R ohms and the inductance L Henrys, then,

$$V = Ri + L(di/dt) \quad \ldots\ldots (1)$$

If $i = I \sin wt$

$di/dt = wI \cos wt$ and

$$V = RI \sin wt + wLI \cos wt$$
$$= \sqrt{R^2I^2 \sin^2 wt + w^2L^2I^2 \cos^2 wt}$$
$$= \sqrt{(R^2I^2 + w^2L^2I^2)(\sin^2 wt + \cos^2 wt)}$$
$$= I\sqrt{R^2 + w^2L^2) \times (1)}$$

the full expression for V being $I\sqrt{R^2 + w^2L^2} \cdot \sin (wt + \tan^{-1} (wL/R)$ (see Fig. 221).

3. The differential coefficient of y with respect to x is variously written dy/dx, $d(f(x))/dx$, $f'x$, or Dy. D stands for d/dx and D signifies dy/dx. The use of D as an "operator" leads to simplification in the solution of certain types of differential equations in cases where it is applicable. Thus, $Dy/dx = Dy$, $d^2y/dx^2 = D^2y$ and so on.

Let $dy/dx = m$; that is, $Dy = m$. Then $y = \int m.dx$. But since $Dy = m$, $y = m/D$ or $(1/D)m$. Therefore $(1/D)m = \int m.dx$, or D^{-1} indicates the operation of integration.

4. $D \times D^{-1}y = D^0y$ and $D^{-1} = (1/D)$

$d(u + v)/dx = du/dx + dv/dx$

or $D(u + v) = Du + Dv$.

$d(ay)/dx = a.Dy$.

$d^2/dx^2 \times (d^3y/dx^3) = d^5y/dx^5$

or $d^n/dx^n \times (d^my/dx^m) = d^{(m+n)}y/dx^{(m+n)} = D^n(D^my) = D^{(m+n)}y$.

5 Let $y = 2x^2 - 3x$. Then,

$Dy = 4x - 3$

$D^2y = 4$.

Now assume $D^2 - 5D + 6 = (D-2)(D-3)$

If D were an ordinary quantity, the last equation is obviously true. What is required is to show that it holds when D has the special significance now given to it.

$(D^2 - 5D + 6)y = D^2y - 5Dy + 6y$.

Using the values for D^2y and Dy given in the equation $y = 2x^2 - 3x$,

$D^2y - 5Dy + 6y$

$= 4 - 20x + 15 + 12x^2 - 18x$.

$= 12x^2 - 38x + 19 \quad \ldots\ldots (A)$

Now $(D-2)(D-3)y$

$= (D-2)(Dy - 3y)$

$= (D-2)(4x - 3 - 6x^2 + 9x)$

$= D(4x - 3 - 6x^2 + 9x) - 2(4x - 3 - 6x^2 + 9x)$

$= 4 - 12x + 9 - 8x + 6 + 12x^2 - 18x$

$= 12x^2 - 38x + 19 \quad \ldots\ldots (B)$.

A and B are identical and an expression containing different powers of the quasi-algebraic term D can be factorized.

6. There are one or two theorems involving the operator D which are useful when dealing with differential equations relating to electric circuits.

a. $(p + qD)$ "operating on" $a \sin (wt + c)$ or

$(p + qD) \cdot a \sin (wt + c) = ap \sin (wt + c) + aq.D \sin (wt + c)$

$\ldots\ldots (A)$

$D \sin (wt + c) = w(\cos wt + c)$.

Therefore (A) is equal to:

$ap \sin (wt + c) + aq.w.\cos(wt+c) = a\sqrt{p^2 + w^2q^2} \sin (wt + c + \tan^{-1} wq/p) \quad \ldots\ldots (B)$

b. $1/(p+qD)$ a $\sin (wt+c)$.

Multiplying top and bottom by p-qD, then

$a(p-qD/p^2 - q^2D^2) \sin (wt+c)$ results $\ldots\ldots (A)$

Now $D \sin(wt+c) = w \cos (wt+c)$

$D^2 \sin (wt+c) = -w^2 \sin (wt+c)$

or, $D^2 = -w^2$. Therefore

$p^2 - q^2D^2 = p^2 + w^2q^2$ and (A) becomes

$ax [p \sin (wt+c) - wq \cos (wt+c)]/p^2 + w^2q^2$

$= a \sin (wt + c - \tan^{-1} wq/p)/\sqrt{p^2 + w^2q^2} \quad \ldots\ldots (B)$

c. $p + qD$ operating on a $\sin(wt+c)$ multiplies the amplitude by $\sqrt{p^2+w^2q^2}$ and causes a *lead* in phase of $\tan^{-1} wq/p$.

$i/p+qD$ operating on a $\sin(wt+c)$ divides the amplitude by $\sqrt{p^2+w^2q^2}$ and produces a *lag* of $\tan^{-1}wq/p$.

d. The simultaneous operation of $p+qD$ and $1/p+qD$ on a $\sin(wt+c)$ should yield the original function. Thus:

$(p+qD)/(p+qD) \cdot a \sin (wt+c)$

$= (\sqrt{p^2+w^2q^2})/(p^2+w^2q) \sin (wt + c + \tan^{-1}wq/p - \tan^{-1} wq/p)$

$= a \sin(wt+c)$ which checks a and b.

Example: In a circuit having a resistance of 10 ohms and an inductance of 0.1 Henry, a current of $I = 5 \sin 377t$ is flowing. Find the voltage.

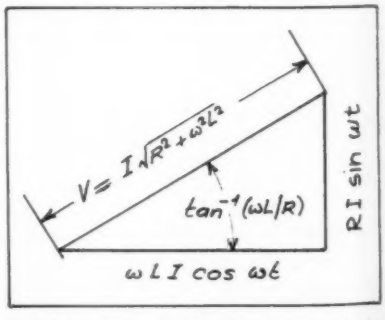


Fig. 221. Geometrical determination of voltage when value of current, resistance and inductance are known.

sistance R ohms and inductance L henrys,

Let $v = V \sin wt$
$= Ri + L(di/dt)$
$= (R+LD)i$

Then,

$i = [(V/\sqrt{R^2 + w^2L^2})] \sin wt - \tan^{-1} wL/R$ .....(A)
(by theorem b)

If the initial time is taken when V = O, then

$Ri + LD = O$ or $di/dt = -(R/L)i$, and

$di/i = -(R/L)\,dt$ which, as is known from previous work, gives,

$i_1 = Ae^{-(R/L)t}$

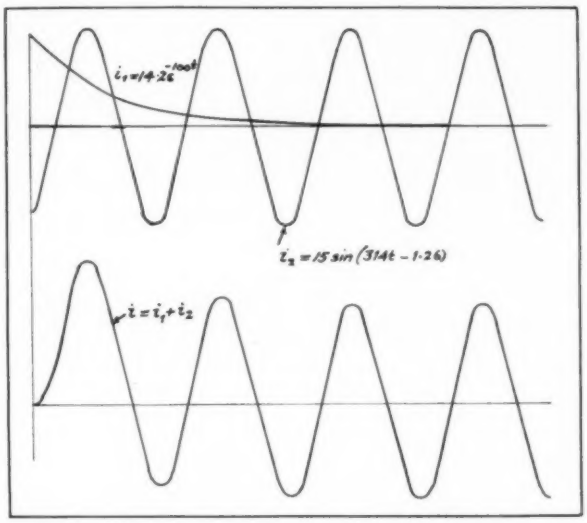


Fig. 222. To show transient conditions when switching on current in a circuit having resistance and inductance.

The complete solution of equation (A) is, therefore,

$i = [(V/\sqrt{R^2 + w^2L^2})] \sin (wt - \tan^{-1} wL/R) + Ae^{-(R/L)t}$

If i = O when the switch is closed, V sin wt = O

and $Ae^{-(R/L)t} = (V/\sqrt{R^2 + w^2L^2})$ sin $\tan^{-1}(wL/R)$.

Calling $\tan^{-1} wL/R$, β, then the transient current $i_1 = (V/\sqrt{R^2+w^2L^2})$. $e^{-(R/L)t}$. sin β amps.....(B)

The total current $i = i_1 + i_2 = (A) + (B)$.

Let R = 2 ohms, L = 0.02 H. w = 314. then tan (wL/R) = 3.14, $\beta = 72.2°$ and sin $\beta = 0.9521$

$e^{-(R/L)t} = e^{-100t}$

Let V = 100 volts, then

$Ae^{-(R/L)t} = (100/\sqrt{4+39.2})$. e^{-100t}. 0.9521. Therefore

$i_1 = 14.2 . e^{-100t}$

wL/R = 3.14 which is the tangent of the angle 1.26 radians.

i_2 is, therefore, equal to 15 sin(314t — 1.26) amps

Fig. 222 is a graph of the two currents and their summation and clearly shows the transient starting conditions.

There is a general theorem of considerable importance since it enables the solution of certain equations relating to electric circuits to be written down at sight. Supposing there is an expression

$y = (a + Db + D^2c + D^3d + \ldots)/(a' + Db' + D^2c' + \ldots)$ .....(1)

and this is operated on by an expression v = V sin wt. D^2 is the symbol for differentiating twice, D^3 three times and so on.

A direct operation is to be performed on V sin wt by multiplying this by the numerator of the expression, and an inverse operation by multiplying V sin wt by the denominator. The result of the direct operation is $y = aV \sin wt + bw\,V \cos wt - cw^2\,V \sin wt - dw^3\,V \cos wt + ew^4\,V \sin wt + fw^5\,V \cos wt + \ldots$ .....(2)

But, w cos wt = D sin wt, $-w^3 \cos wt = -w^2$ D sin wt and so on. Hence (2) may be written,

a V sin wt + Db sin wt — cw^2V sin wt — dw^2D V sin wt + ...

and this becomes

$[(a - cw^2 + ew^4 - \ldots.) + (b - dw^2 + \ldots.)]$ V sin wt

Writing $p = a - cw^2 + ew^4 - \ldots.$ and $q = b - dw^2 + \ldots.$

then

$(a + bD + cD^2 + dD^3 \ldots)$ V sin wt $= (p+qD)$ V sin wt

But, $(p+qD)$V sin wt
$= p$ Sin wt + qD sin wt
$= pV \sin wt + qwV \cos wt$
$= (\sqrt{p^2 + w^2q^2})$ V sin $(wt + \tan^{-1} qw/p)$

The inverse operation will just neutralize the direct operation and, consequently,

V sin wt/ $(a' + b'D + c'D^2 + dD^3 \ldots.)$ .....(3)

results in the amplitude V being divided by $\sqrt{p'^2 + q'^2}$ and the phase of the resultant vector being retarded by the angle $\tan^{-1}$ (q'w/p')

or, (3) = $(V/\sqrt{p'^2 + q'^2})$ sin (wt– $\tan^{-1}$ q'w/p').

Consider the case of a current in a circuit having a resistance of R ohms and an inductance of L henrys. The impedance operator is R +LD.

Therefore,

$i = (1/R+LD)V \sin wt$

$p = 1$, $q = O$

$p' = R$, $q' = L$.

Therefore,

$i = \sqrt{(1/R^2 + w^2L^2)}V \sin (wt + \tan^{-1}0 - \tan^{-1}wL/R)$
$= V \sin (wt - \tan^{-1}wL/R)/\sqrt{R^2 + w^2L^2}$

For a circuit having a non-inductive resistance of R ohms in series with a condenser of K farads, the impedance operator is $R + (1/KD)$

$$i = \left[\frac{1}{R + 1/KD}\right] V \sin wt$$
$= (KD/1+KRD)$ V sin wt

Here $p = O$, $q = K$,
$p' = 1$, $q' = KR$

Therefore,

$i = (\sqrt{K^2w^2/1+R^2K^2w^2})$ V sin $[wt + \tan^{-1}(Kw/O) - \tan^{-1}(KRw/1)]$

Remembering that $\tan(\pi/2-\theta) = \cot\theta$ and since $\tan^{-1}(Kw/O) = \tan^{-1}$ (infinity) $= \pi/2$ or 90°. Then $\cot^{-1}\theta = \cot^{-1}$ KRw/1 which is equal to $\tan^{-1}$ 1/KRw.

Now $\sqrt{K^2w^2/1 + R^2K^2w^2} = \sqrt{1/(R^2 + 1/K^2w^2)}$ and finally

$i = V \sin [wt + \tan^{-1}(1/KRw)]/\sqrt{R^2 + 1/K^2w^2}$

In a circuit having resistance R, inductance L and capacity K, the impedance operator is $R + LD + (1/KD)$

$$i = \frac{1}{(R + LD + 1/KD)} . V \sin wt$$
$= [KD/(1 + KRD + KLD^2)]V \sin wt$

In this case $p = O$, $q = K$
$p' = 1\text{-}KLw^2$, $q' = KR$

Therefore,

$i = [\sqrt{K^2w^2/(1\text{-}KLw^2)^2 + R^2K^2w^2}].V \sin [wt + \tan^{-1} Kw/O - \tan^{-1}(RKw/1\text{-}KLw^2)]$

As before, $\tan^{-1}Kw/O$
$= \tan^{-1}$ infinity and $\tan(\pi/2) - \tan^{-1}(RKw/1\text{-}KLw^2)$
$= \tan^{-1}(1\text{-}KLw^2/RKw)$
$= \tan^{-1}(1/wk - wL)/R$

Further,

$$\sqrt{K^2w^2/(1\text{-}KLw^2)^2 + R^2K^2w^2} = \sqrt{\frac{1}{R^2 + (1/wK - wL)^2}}$$

and,

$$i = \frac{V \sin \left[wt + \tan^{-1}\left(\dfrac{1/wK - wL}{R}\right)\right]}{\sqrt{R^2 + (1/wK - wL)^2}}$$

Fathers and Sons in the Inden

THIS IS THE EIGHTH of a series of articles featuring "Fathers and Sons in the Independent Telephone Industry" . . . Through the publication of pictures of fathers and sons, with brief biographical notes, TELEPHONY is introducing these sons—the younger generation and tomorrow's potential leaders—to one another and to the field in general.

JESSE FINLEY SMITH, vice-president and general manager of the Ohio Community Telephone Co., Cadiz, Ohio, has spent his entire adult life in the telephone business. His son, **ROBERT ABRAM,** has been associated with the telephone business since 1923.

JESSE F. SMITH was born in Green township, Harrison county, Ohio, December 31, 1881. His public school education was supplemented by a course in telephone engineering from the International Correspondence School. His first telephone experience was in the ranks of the Bell company in 1901. The following year he was employed by the Harrison County Telephone Co. of Cadiz as troubleman.

About three years later he was named manager of the company, taking on the added duties of secretary in January, 1908. In 1909, when a number of Independent companies in Harrison, Jefferson and Belmont counties were consolidated under the name of the Harrison & Jefferson Telephone Co., with a capitalization of $250,000, Mr. Smith was elected secretary. A few years later he was made general manager as well as secretary of the company.

When reorganization of the company was effected in 1929, under the name of the Ohio Community Telephone Co., he became vice-president and general manager.

Mr. Smith has witnessed the growth of the original company—through purchases and consolidations, as well as growth and expansion—from an exchange of 100 stations to a system of 12 exchanges and 2,300 stations.

He is a past master of the Masonic lodge in Cadiz and a member of the Lions Club. He has been a director of the Ohio Independent Telephone Association for several years.

As to his hobbies, Mr. Smith reports that fishing and hunting are greatly enjoyed by him. At one time, he states, both he and his son spent much of their spare time fishing, but neither has had an opportunity in recent years for this favorite sport.

R. A. SMITH (known as "BOB" to his close friends and associates) was recently made vice-president and general manager of the Blue Mountain Telephone & Telegraph Co., of Bangor, Pa. Previously he was, for four years, manager of the Wiconisco Telephone & Telegraph Co., of Elizabethville, Pa.

Born in Cadiz, Ohio, June 22, 1909, Bob attended the Cadiz high school and Mt. Union College. While still in school, during the summers of 1923 and 1924 he served as helper for cable-splicers of the Harrison & Jefferson Telephone Co. During the next two summers he worked with the line gang and was engaged in miscellaneous maintenance work.

In the summer of 1927 he was employed as helper for the switchboard installer. During the ensuing two years he was engaged in plant engineering, collections and miscellaneous commercial work. From 1930 to 1933 he served as plant accountant for a number of companies in Ohio and Pennsylvania.

Then from 1934 until his recent appointment with the Blue Mountain company he was manager of the Wiconisco company at Elizabethville, Pa. During his four years with the Wiconisco company he succeeded in effecting a 25 per cent telephone station increase.

His hobbies, in addition to hunting and fishing — like those of his father —are photography and golf. He is a Mason and a member of the Rotary club.

Seated in his easy chair, J. F. SMITH, vice-president and general manager of the Ohio Community Telephone Co., Cadiz, Ohio, is "sampling" his company's product. Shown in the inset, in a characteristic pose, is his son, R. A. SMITH, now vice-president and general manager, Blue Mountain Telephone & Telegraph Co., Bangor, Pa.

WESLEY HORACE LOOMIS, JR., of Kansas City, Mo., is president of the Loomis Advertising Co., which serves as directory advertising sales agent of some 450 Independent and Bell telephone properties in 14 central and eastern states, while his son, **WESLEY HORACE LOOMIS III,** is an industrial engineer for the Automatic Electric Co., Chicago.

Born in Hannibal, Mo., March 29, 1884, WESLEY H. LOOMIS, JR., graduated from the central high school of Kansas City in 1901. Subsequently he attended the school of engineering of the University of Kansas, class of 1905. Interested in sales work, he was western sales agent for the Frost-Johnson Lumber Co., St. Louis, Mo., for four years from 1907 to 1911. In 1911 he became vice-president of the Theodore Gary Investment Co., of Kansas City. During 1916 and 1917 Mr. Loomis

W. H. LOOMIS, JR. (to the right), is president of the Loomis Advertising Co., Kansas City, Mo. His son, W. H. LOOMIS III is an industrial engineer for the Automatic Electric Co. Chicago.

was a business and advertising executive with the national publication, Food and Produce. In 1918 he became an advertising executive, telephone directory engineer and publisher and has continued in that capacity down to the present time.

In the years of his association with telephone directory publication and advertising Mr. Loomis has been president of the Kansas City Telephone Directory Co. and is now president of the Gary-Loomis Co., the Walnuts Residence Co. and the Loomis Advertising Co.

In addition to telephone advertising he has been associated with various telephone companies. In 1917 he became a director of the Kansas City Telephone Co. and served until its merger in 1925 with the Southwestern Bell Telephone Co. For a time he was a director of the Associated Telephone & Telegraph Co. He is a director of Theodore Gary & Co., the Telephone Bond & Share Co. and the Tri-County Telephone Co.

Many early associates give Mr. Loomis credit for originating the custom of beginning a telephone conversation with the salutation, "Good morning" or other greeting suitable to the time of day. He pioneered in public relations advertising and also in the advertising of "short distance toll" calls.

Mr. Loomis is a 32nd degree Mason, a Shriner, and a member of a number of Kansas City clubs, the Racquet Club of Chicago and the Bankers Club of America of New York City. He served as director of the University Club of Kansas City from 1924 to 1927 and as vice-president from 1925-1927.

Among his hobbies are horseback riding and motoring, youth welfare and highway safety.

WESLEY HORACE LOOMIS III was born in Kansas City, July 29, 1913. He pursued his studies at the Hackley School, Tarrytown, N. Y., and the Massachusetts Institute of Technology, graduating from the school of business and engineering administration of the latter institution with a bachelor of science degree.

After graduation he commenced learning some phases of the telephone business, acquiring experience from October 1, 1935, until July 1, 1936, in the statistical department and as assistant to plant superintendent of the Automatic Electric Co. From that date until October 1, 1938, he served as assistant to the secretary in the corporate offices of the Gary Group. Since the first of October he has been engaged in industrial administration work for the Automatic Electric Co. in the capacity of industrial engineer.

He is a member of the Kansas City Country Club, the University Club of Chicago, the Phi Gamma Delta Club of New York City, and the M. I. T. Alumni Association.

▼

EDWARD S. SLUSHER, of the Illinois Commercial Telephone Co., at Macomb, Ill., has a son in the telephone industry of whom he is very proud. **GAROLD** — better known as "Gary"—is traffic superintendent of the Up-State Telephone Corp. of New York, with headquarters at Johnstown, N. Y.

EDWARD S. SLUSHER was born in Willis, Va., March 11, 1886. After a public school education, he worked as a farm laborer from 1900 to 1905, in the meantime taking a correspondence course in telephone operation and management.

In 1905 he was employed by the Blandinsville Telephone Co., at Blandinsville, Ill., as night operator and repairman. Two years later he was advanced to the post of manager of the company, continuing in that capacity until in 1911. In December of that year he organized the Macomb Telephone Co., of Macomb, Ill., serving as vice-president and manager until January 1, 1926.

Then from 1927 until 1930 he had charge of the Illinois Northern Telephone Co., with headquarters

E. S. SLUSHER, Macomb, Ill., proudly displays the prize of one of his hunting expeditions. His son, "GARY," Johnstown, N. Y., is putting his pet dog through some tricks.

P·A·B·X

Promotion

Profitable!

Develop the Vast Market Which Exists for Unattended Private Exchange Service » » »

Many business and professional men still believe that private branch exchange service necessitates an attendant. And because their organizations are too small to justify attended switchboards, they limit their use of communication services to individual lines and extensions.

It will pay you to tell such subscribers about the new Automatic Electric unattended P-A-B-X's which require no private exchange operator. These compact units permit trunk calls to be placed or "picked up" from any station. Interior communication is entirely automatic and available night and day. Yet because no attendant is required, the total cost of such service is well within the budget of even the smallest organizations!

Larger firms, whose business requires attendants for outside contacts, also prefer P-A-B-X service because of the lightning-fast interior communication it provides. They also like the "special" executive control services which can be easily incorporated in the system—such as Code Call, Conference Service, Executive Key Calling, Right-of-Way, Watchmen Checking, and others to meet individual needs.

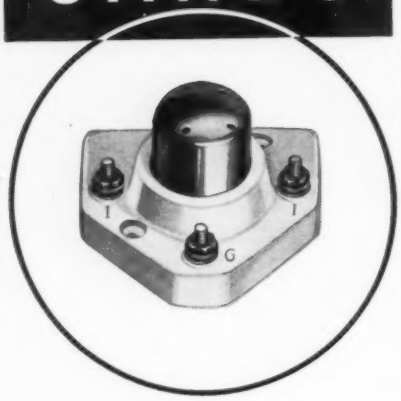
Let us tell you how P-A-B-X promotional effort can increase your private exchange revenue. Ask our representative to show you the literature we have prepared especially for your use, and which we will gladly provide free of charge. Or write to us direct for full information.

AUTOMATIC ELECTRIC

MAKERS OF TELEPHONE, SIGNALING AND COMMUNICATION APPARATUS
ELECTRICAL ENGINEERS, DESIGNERS AND CONSULTANTS

Distributors in U. S. and Possessions:
AMERICAN AUTOMATIC ELECTRIC SALES COMPANY, 1033 W. Van Buren Street, Chicago, U.S.A.
Export Distributors: AUTOMATIC ELECTRIC SALES COMPANY, LIMITED

SANDS



TYPE 16
SUB-STATION
ARRESTER

A compact, inexpensive sub-station arrester providing adequate protection where crosses with electric circuits are not likely to occur. Consists of two Type 2105 discharge blocks mounted in a heavy porcelain base and covered with a brass cap. Ask for more detailed information on this and other Sands protection equipment.

SANDS PROTECTION EQUIPMENT
Is Made by:

AUTOMATIC ELECTRIC COMPANY

Distributed by:
AMERICAN AUTOMATIC ELECTRIC SALES CO.
1033 West Van Buren Street, Chicago
Export Distributors:
AUTOMATIC ELECTRIC SALES COMPANY, LTD.
Chicago

at Kewanee, Ill., as vice-president and treasurer in charge of operations. Since then he has been associated with the Illinois Commercial Telephone Co., one of the largest Independent companies in Illinois.

Mr. Slusher is a member of the Masonic lodge and the Elks and Kiwanis clubs. Hunting and fishing are his hobbies. During 1927, 1928 and 1929 he served as a director of the Illinois Telephone Association.

GAROLD SLUSHER — known as "Gary" to his family and intimate associates—continued studies for a short time at the University of Wisconsin and the University of Illinois, after graduating from the Illinois State Teachers' College. He then secured employment in the traffic department of the Associated Telephone Utilities Co., with headquarters in Madison, Wis. This later became the General Telephone Corp., with headquarters in New York City. In 1937, Gary was transferred to Johnstown, N. Y., as traffic superintendent for the Up-State Telephone Corp. of New York, one of the properties owned and operated by the General Telephone Corp.

▼ ▼

Star Salesmen Company's Honored Dinner Guests

Fifty-four of the employes of the Lincoln (Neb.) Telephone & Telegraph Co. who qualified as star salesmen in the year's drive for business during 1938, by making their quotas or over, were guests of the company recently at a dinner in Lincoln. Titled kings and queens and wearing gilded paper crowns to prove their royalty, they were encouraged to "strut their brief hour." Seventeen of the number were from Lincoln.

Speakers included J. H. Agee and H. F. McCulla for the company, the districts being represented in responses by Miss Florence Buehler, Beatrice; Miss Beatrice Rohrer, Hastings; W. C. Lant, Nebraska City; Gordon Eno, York, and Miss Laura Sires, Lincoln.

PARASITES

By ANNE BARNES

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

PARASITES? What are they? There are two types about which I know: certain insects that attach themselves to plants, hang on tightly and feed on the plants; the other, certain human parasites who attach themselves to people who cannot or do not ward them off.

I have in mind a human parasite who attaches herself to folks she thinks she can feed on for gossip or information she desires.

We used to have a neighbor like that. As soon as her home was cleared of her family in the morning, she left her housework at sixes and sevens, came over to our house, and sat down in the kitchen to gossip about people, and try to get us to express our opinion.

"You ought to know; you surely hear things at central," was her parting shot to me. But our mother always remarked after this neighbor left: "Take all she said with a grain of salt."

In many small towns one's business is everybody's business. News travels fast, especially when the human parasite gossip makes her rounds. Beware of one of these gossip parasites when she drops in at central, asks for a number, and then casually remarks, "What's new in town, Bessie?"

If Bessie says, "Nothing new that I have heard of," the parasite asks: "I suppose you heard that the Jonses changed doctors for Willie. It's all over town. You should know!"

Poor Bessie is on the spot and between two fires. She cannot give out this information, and she dreads getting the ill-will of this human parasite gossip.

Beware of the human parasite gossip visitor in all telephone exchanges, especially the very small ones. She gimlets poison into your mind and gimlets information from you, poisons it with her own mind and carries it on to her next victim.

"Central told me—who certainly should know!" That should be proof enough for anybody, she thinks.

SUB-CYCLE

The MASTER Ringing Converter
CONSISTENTLY PREFERRED

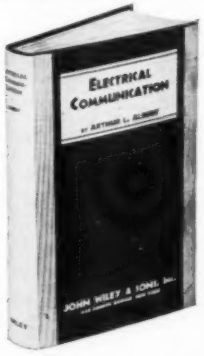
- FIVE MODELS TO SERVE YOU
- INCLUDING PULSATORS IF REQUIRED
- OUTPUTS 20 OR 50 WATTS
- PRICES $45.00 TO $113.50
- WRITE FOR NEW BOOKLET

MODEL "S"
Output 20 Watts
PRICE $45.00

- NO MOVING PARTS
- NO VIBRATING CONTACTS
- NO ROUTINE MAINTENANCE
- NO RADIO INTERFERENCE
- OPERATES ON COMMERCIAL A.C. SUPPLY

LORAIN PRODUCTS CORPORATION
LORAIN, OHIO
Sold by Leading Distributors

Address Foreign Inquiries to
Automatic Electric Sales Co., Ltd.
Chicago, Ill.



Discusses the entire industry!

ELECTRICAL COMMUNICATION

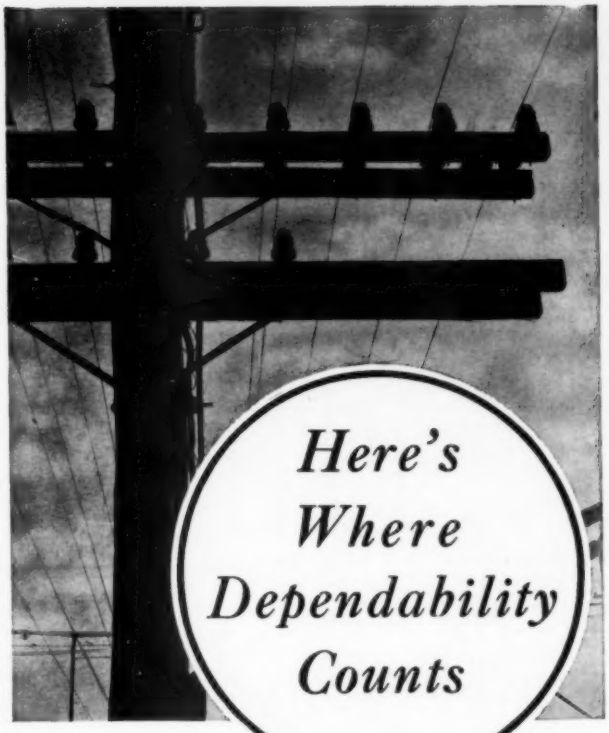
By ARTHUR L. ALBERT

Associate Professor of Communication Engineering, Oregon State College

A study of the various specialized phases of electrical communication as related to the usages of modern communication systems. This book presents not only theory but a discussion of the entire industry. Although not highly mathematical, the treatment is exact, up-to-date, and in accord with the highest engineering standards. The communication engineer will find this book a valuable addition to his working reference library.

448 Pages **$5.00** **6 by 9**

TELEPHONY PUBLISHING CORPORATION
Telephone Wabash 8604 608 S. Dearborn St., Chicago



THE dependability and long life of Perfected Telephone, Telegraph Wires and Strand are no small factors in the excellent operation of the nation's communication systems.

The long life of these wires is further increased by our hot galvanizing process, a tried and tested method wherein the properly treated wire is passed through a molten bath of pure, high grade zinc. Both metals are chemically bonded, to form as strong a combination as when hydrogen is combined with oxygen to form water.

The zinc coating applied by this hot process will not flake, crack or disintegrate under the hardest of service conditions. The coating fully satisfies every service and laboratory requirement for ductility, strength and corrosion resistance.

Because of these facts, millions of miles of Perfected Telephone, Telegraph Wires and Strand are now in service—and coil after coil is specified today with every confidence of long life.

U·S·S PERFECTED
Telephone, Telegraph Wires & Strand

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Products Co., New York, *Export Distributors*

UNITED STATES STEEL

Theory of Modern Television

(Continued from October 8, 1938)

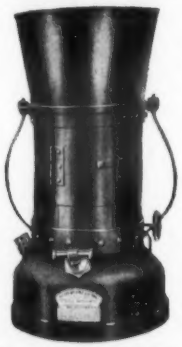
Basic Features of Kinescope

The kinescope is a special cathode ray tube designed primarily for the reproduction of television pictures, at the television receiver. It is available to amateurs and experimenters at a very moderate price. The RCA type 1800 kinescope is designed for use with electromagnetic deflection rather than electrostatic and is referred to as the nine-inch size (Fig. 18). It has a diameter of 9 inches at the bulb end.

The chemical composition of the fluorescent screen is such that it gives off light of a yellowish hue. The picture size which can be accommodated is 5½ inches by 7⅜ inches.

The connections to the tube consist of a six-prong base to which are connected two heater connections, anode No. 1 connection, grid No. 1 connection, grid No. 2 connection, and the cathode. In addition, there is a metal cap connection mounted on the side of the tube which constitutes a terminal for anode No. 2. The overall length of the tube is approximately 20 inches.

Typical operating voltages for the RCA-1800 kine-



No. 52 Firepot—1 Gallon, Gasoline or Kerosene.

BERNZ No. 52
Jumbo Splicer's Firepot

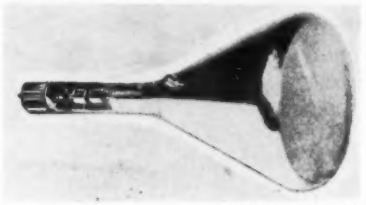
This patented splicer's firepot has proved itself to be the best and most dependable firepot in use. Here's why—

The low down construction permits use in manholes. The superstructure protects flame in stormy weather and is quickly removed by use of a bayonet lock. It is not necessary to use a guard with this firepot.

Patented trouble-free burner operates at least 500 hours with kerosene, and indefinitely with gasoline. Replacement of inexpensive coil, after long use, makes article as good as new.
Adopted as standard by the most prominent utilities.

A trial order will convince you.

OTTO BERNZ CO., INC.
ROCHESTER, N. Y.
ESTAB. 1876



(Courtesy of RCA)

FIG. 18. VIEW OF TELEVISION KINESCOPE.

scope are: The heater requires 2.5 volts and consumes 2.10 amperes. Anode potentials between 3,000 and 6,000 volts can be used on No. 2 anode, and between 600 and 1,250 volts on No. 1 anode.

The voltage on grid No. 1 required for current cutoff is approximately 75 volts. This voltage is, of course, adjusted to give a suitable spot on the screen. The voltage required to modulate grid No. 1 so as to produce a suitable television picture is approximately 25 volts. An RCA kinescope of the type described herein is shown in Fig. 18.

Simple Operation of the Kinescope

The basic operation of the kinescope is quite simple. The "electron gun" or emitter arrangement is so designed that, with the proper voltages on the several anodes and grids, the beam of electrons emitted by the cathode is focused on the fluorescent screen and produces a tiny spot of light at the point where it strikes. The brightness of this light spot is controlled by a modulating television signal which is applied to grid d Fig. 19.

When the control grid is made more negative, due to the incoming television signal, the spot becomes less bright; and when the grid is changed in a positive direction by the signal, the spot becomes brighter than normal.

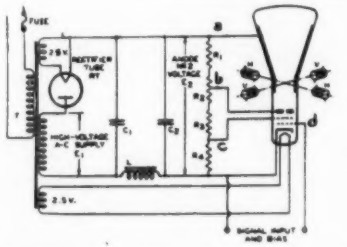
By means of electromagnetic deflection coils which are mounted so as to control both the horizontal and the vertical movement of the beam, the spot of light

can be swept back and forth across the face of the fluorescent screen so as to scan the entire picture area. For this purpose current having a substantially sawtooth wave form must be supplied to the vertical and horizontal coils.

As a result of the modulation and motion of the spot there is reproduced on the screen of the kinescope the scene impressed on the iconoscope or camera eye at the distant television transmitter.

Power Supply Circuit for Kinescope

In order to obtain a good working knowledge of television it is necessary that the various component parts in the television receiver be broken down into small units, each of which is then carefully studied. Taking up first the power supply circuit recommended by the manufacturer of these tubes, Fig. 19 illustrates the schematic diagram and the constants of the parts.



CIRCUIT COMPONENT	SPECIFICATIONS		
R_2	3000 V.	4500 V.	6000 V.
C_1, C_2	.05MF, 5000 V.	.05MF, 4500 V.	.05MF, 9000 V
R_1	5 M, 2W	5 M, 3W	5 M, 5W
R_2	500M 1W	500M 1W	500M 1W
R_3	300M .5W	400M 1W	500M 1W
R_4	500M .5W	400M 1W	300M 1W
R_1	2300V. RMS	3400V. RMS	4600V. RMS
RT	TYPE 879	TYPE 878	TYPE 878

A = ANODE NO. 2
B = ANODE NO. 1
C = GRID NO. 2
D = GRID NO. 1
L = 1000 HENRIES AT 1MA. D.C.
H = Hor.-DEFLECTING COILS
V = VERT.-DEFLECTING COILS
T = POWER TRANSFORMER

FIG. 19. POWER SUPPLY CIRCUIT FOR RCA TYPE 1800 KINESCOPE.

The Operators' Corner

By MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

PROPER handling of "Collect" calls an interesting topic for discussion. Series No. 354

QUESTIONS pertaining to the handling of collect calls, particularly station-to-station collect calls, are an interesting topic for discussion in practically every traffic conference.

Question No. 4 in this series is: "When you have a station-to-station collect call and the called party tells you to call back in an hour, or there is no one there to talk for an hour, how would you handle the call?"

A call of this kind is considered equivalent to one on which the called station refuses to accept the charge. The report is entered, underlined, together with an explanation on the ticket, and if the calling party is holding the line, ask, "Will you pay for the call?" and proceed as directed.

If the calling party indicates that he has not heard or understood the report, or if he has not been holding the line, give the report saying, for example, "No one is there now who will accept the charge. Will you pay for the call?" or, "I have been unable to get anyone to accept the charge. Will you pay for the call?" as seems appropriate, and proceed as directed.

The action to be taken when you are unable to secure the acceptance of the charge on a collect call is largely dependent upon the information secured or volunteered at the called station. For example, if the called station refuses to talk and the person answering is plainly not qualified to talk (such as a child or a workman or cleaner who happens to be on the premises temporarily) the operator will ask the calling party: "Shall I try your call later?" If his answer is in the affirmative and the calling party does not specify a time to try his call, the operator will offer to try the call again in 20 minutes.

On the other hand, if the called-station refuses to talk and the report is received from a person who obviously could talk if willing to do so —for example, someone who can take a message or answer questions, such as a maid or cook or a member of the household, an employe of the firm or someone in a secretarial position —the operator will consider the call as equivalent to one on which the called station refuses to accept the charge. She will enter the report, underlined, on the ticket, and say to the calling station, for example: "No one is there now who will talk."

If the calling party cancels the call, it will be subject to a report charge. If he does not cancel the call, the operator will proceed in accordance with his instructions.

Questions from Illinois Operators

1. Is it necessary for an operator to show on her ticket when word has been left on a particular party call?
2. What can you say to your subscriber when he gets angry over his call and the fault is with your toll center?
3. If you have more than one subscriber with the same name (first and last name) and you have no way of knowing which one the party wants, what action should be taken when you are required to give information from the switchboard?
4. When you have a station-to-station collect call and the called party tells you to call back in an hour or there is no one there to talk for an hour, how would you handle the call?
5. If you are in doubt as to whether an operator is ringing a number, how long should you wait before asking for an AG?

The answers to these traffic questions are given on page 33.

STEEL STRAND ◆ TELEPHONE WIRE

Crapo GALVANIZED PRODUCTS

SPECIFIED BECAUSE OF PROVED PERFORMANCE

Crapo Galvanized Steel Strand has earned its enviable reputation for long, dependable, economical life by outstanding performances in actual service. That's why it so often is specified by leading utilities for the more important construction jobs. The heavy, uniform, pure zinc coating—applied by the *Crapo* Process—is notable for its adhesion and ductility; its ability to withstand bending and twisting; its lasting resistance to corrosion. Both the finished strand, and the wire from which it is made, conform in every detail to the most rigid specifications for tensile strength, elongation, size, galvanizing and ductility.

Crapo Galvanized Strand is readily available in all standard grades and sizes. Ask your Jobber, or write direct for technical details!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

FIG. 19. POWER SUPPLY CIRCUIT FOR RCA TYPE 1800 KINESCOPE.

By means of electromagnetic deflection coils which are mounted so as to control both the horizontal and the vertical movement of the beam, the spot of light

OTTO BERNZ CO., INC. ROCHESTER, N. Y. ESTAB. 1876

No. 52 Firepot—1 Gallon, Gasoline or Kerosene.

Bell Saves Millions Using Long Life Tube

TESTIFYING before Senator O'Mahoney's monopoly investigating committee in Washington, January 18, Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, Inc., told of a "long life" vacuum tube adaptable for use in the ordinary household radio receiving set. The tube was described as having 20 to 50 times the life of an ordinary tube and using less power. It has been used on the long distance telephone circuits of the Bell System since 1923. Its use last year saved the Bell $10,000,000.

Dr. Jewett said the radio laboratories had developed such a vacuum tube about 15 years ago, but so far as he knew no manufacturer had ever offered it for use.

The Bell System, Dr. Jewett said, sought always to produce equipment of the longest possible life to reduce maintenance costs. He added that he told the story at the suggestion of a committee member only for purposes of illustration. Richard Patterson, assistant secretary of Commerce, asked if the long-life Bell tube was available on the market for ordinary radios, to which the witness replied that the principle could be adapted for the radio, but it had not been done.

Dr. Jewett stated that the tube adopted by the Bell System about 1923 had a life of 50,000 hours, compared to 1,000 hours for the tubes then in use. It consumed only half as much current and was less costly to manufacture. The improved vacuum tube, he testified, saved the Bell System $10,000,000 last year, but had cut Western Electric's production to one-fiftieth of the number of old style tubes that would have been needed.

He stated that the radio tube manufacturers continued to make a tube of shorter life even though the Western Electric shifted to the long-life tube. He said it meant that the number of tubes made by Western Electric was considerably reduced, but the loss from this production schedule was more than offset in the whole Bell System through the reduced maintenance and replacement costs which resulted.

"This shows how your philosophy affects the things you do with the same tools," Dr. Jewett observed. "If Western Electric had not been a part of the Bell System it would not have had the incentive for making products of long life."

This, he said, showed the wisdom of the organizers of the Bell System "back in Boston in 1880," who decided that as a matter of basic policy the supplier of physical things should always be subordinate to the user of those things.

Dr. Jewett said that the interests of the general radio parts manufacturers and the Bell interests were quite different, the Bell System being interested only in the manufacture of long-life, low-maintenance-cost devices, while the general manufacturing companies always had directed their attention toward reducing the resale price of their product.

"They'd have to learn a new technique to do it," he added.

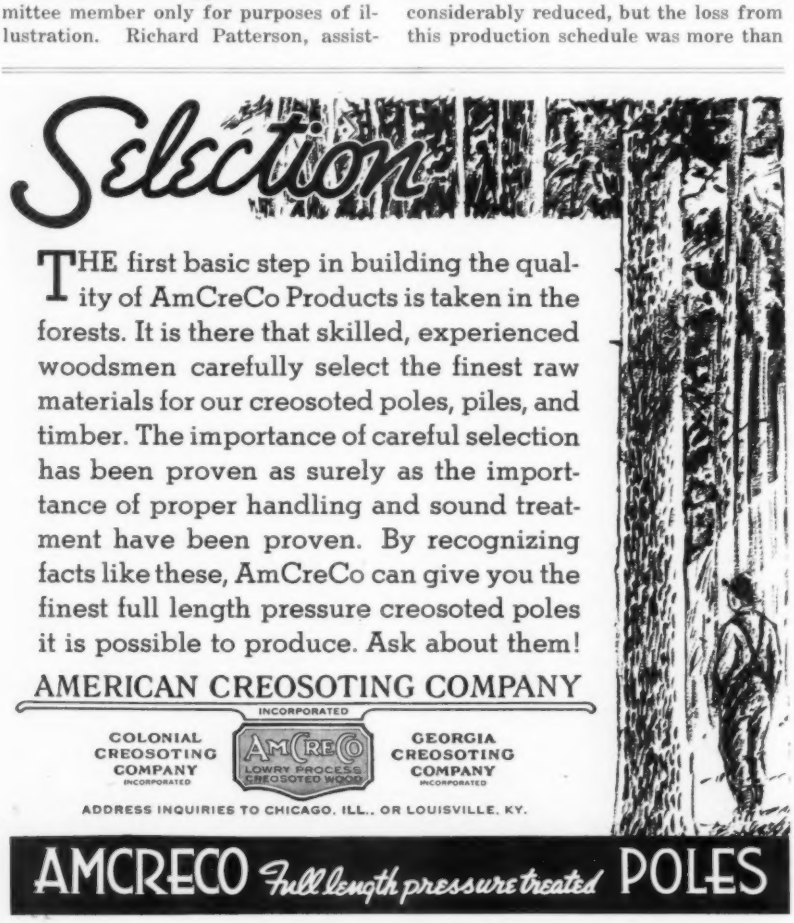
Chairman O'Mahoney requested Dr. Jewett to find out for the committee if the Western Electric would be permitted under its cross-licensing agreements to produce for general radio use a vacuum tube based on the Bell Laboratories' principle.

At the request of Commissioner Ewin L. Davis of the Federal Trade Commission he also asked Dr. Jewett to find out whether the Western Electric would make the tube available for the manufacture by independent radio manufacturers.

Dr. Jewett testified that the interest of the Bell Laboratories in patents was principally in the encouragement which the patent system gives to individual inventors, asserting that the Bell System no longer is dependent upon patents for the security of its position — even though it holds 15,000 of them—but obtains its security from the fact that it is a "natural monopoly."

The general policy of the Bell System, Dr. Jewett said, is to "grant licenses broadly" on the 15,000 patents it holds.

Philo T. Farnsworth, vice-president of Farnsworth Television Corp. and inventor of a device which has made television possible without the use of mov-


Selection
THE first basic step in building the quality of AmCreCo Products is taken in the forests. It is there that skilled, experienced woodsmen carefully select the finest raw materials for our creosoted poles, piles, and timber. The importance of careful selection has been proven as surely as the importance of proper handling and sound treatment have been proven. By recognizing facts like these, AmCreCo can give you the finest full length pressure creosoted poles it is possible to produce. Ask about them!
AMERICAN CREOSOTING COMPANY
INCORPORATED
COLONIAL CREOSOTING COMPANY INCORPORATED
AMCRECO LOWRY PROCESS CREOSOTED WOOD
GEORGIA CREOSOTING COMPANY INCORPORATED
ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.
AMCRECO Full length pressure treated POLES

ing parts, assured the committee on January 19 that industry has not attempted to "suppress" the new art. He attributed delay in commercial operation of television to a combination of factors inherent in American broadcasting which he said had now been virtually overcome.

Besides denying this, Mr. Farnsworth also asserted that the failure of manufacturers to market widely a "long life" radio tube was "in no way an attempt to evade a public demand." Radio sets become obsolete so rapidly, he said, that no owner would want a tube which might last many times as long as the receiving set was in use.

Styles of tubes also change rapidly, he said. A change of tubes on an average of once a year is required, making it impractical to produce the longer life product, he stated.

Here and There in the Field

A Company's History and An Employe's Work

Mark T. Caster, widely-known because of his interest and participation in the national conventions of the telephone industry, as well as of the national safety council, was the guest of honor at a dinner tendered him in Lincoln, Neb., by the Lincoln Telephone & Telegraph Co. on the occasion of his retirement under the company pension plan from the position of general plant superintendent. He will continue as safety director.

Frank H. Woods, president of the company, was the principal speaker. He said that Mr. Caster was one of the first men employed during the first era in the company's history, that of organization, and paid high tribute to his capabilities and the part he had in building up a plant that maintains a high standard of service.

He said that Mr. Caster's career was an exemplification of a fact that needs to be emphasized in these times when there exist such fantasies as $30 every Thursday. It is that the secret of success is hard work, plus a constant effort to improve one's knowledge of his job, and intelligent application of what is learned.

The company entered the field in Lincoln when it was already occupied by the Nebraska Telephone Co., a Bell subsidiary, Mr. Woods stated, and while there was a field for the operations of both, it was limited. When the saturation point was reached, intense competition developed. This was ended on the initiative of Theodore N. Vail; and the result was a division of territory in the state that did away with what the public never did want, duplicate service.

This was the forerunner of the end of competition everywhere in the country, initiated when the speaker was president of the National Independent Telephone Association. Then followed for the Lincoln company a period of expansion and growth, halted for the time being by economic conditions, which has resulted in an organization of which every member is proud and which stands high in public estimation.

Mr. Woods said that while he had not been active in the details of operation the company had followed a program based on the belief that a telephone company had three important functions to perform: to serve the public well at reasonable rates; to give a reasonable return on the investment to stockholders, and to maintain a proper wage and salary level. The company had succeeded well, he thought, in discharging the first two functions, and would do better with respect to the third as conditions improve.

Leonard E. Hurtz of Omaha, first general manager of the company, dwelt mostly upon the construction problems which he and Mr. Caster had to work out in the early days of the company, the economies they were compelled to observe and the proof afforded that it takes "economy and hard work to build men."

Other speakers were R. D. Brewster, general traffic superintendent; R. H. Fair of the Northwestern Bell Telephone Co. plant department, retired; and W. E. Bell, C. P. Russell and H. W. Wheeler, retired heads of general departments of the Lincoln company.

John H. Agee, general manager of the company, presided as master of ceremonies. He said that Mr. Woods was responsible for every sound policy of the company, and that the compliments to Mr. Caster by various speakers reflected tributes to the company's president.

ECONOMIZE WITH

"Reliable"

BRIDGING CONNECTORS

Substantial saving effected in installation time and assurance of a trouble-free connection. A superior standard in solderless connectors.

Hinged mechanism at end of bolt makes nut integral part of unit, eliminating dropping.

Top view illustrates *"Reliable"* No. 109 W connector — correct copper to iron connection. Below *"Reliable"* No. 104 N connector for copper to copper.

Reliable ELECTRIC COMPANY

OVER 25 YEARS SERVICE TO THE UTILITIES

3146 CARROLL AVENUE CHICAGO, ILLINOIS

Mr. Caster expressed his appreciation of the tributes to him paid by the various speakers, and said that only with the aid of his associates could the job have been done. He said that he had benefited much from the philosophy of life learned from Frank Woods as applied in dealings with others.

At the close of the dinner Mr. Caster was presented with a handsome silver tea set.

"I Wonder Why" of a Telephone Engineer

By Ray Blain

I wonder why some telephone companies are so reluctant to spend a few dollars when, in most cases, these expenditures will considerably increase their incomes?

It has been said that railroads had to spend themselves into prosperity. There is no doubt that the new speed trains have greatly increased railroad travel. Automobile models change annually but a material change is made in telephones only about once in each generation. The average exchange manager seems to be of the opinion that telephones do not depreciate and should last forever.

A great number of obsolete telephones are now in daily use which can not be considered up to par in any way. Add to this, their appearance is anything but attractive when compared with present-day modern instruments.

It is quite true that change-over to a more modern telephone in any exchange must be gradual so as to avoid a stampede. If proper precautions are taken, however, this can be accomplished to the mutual advantage of the subscribers and the telephone company.

A certain telephone company, of which I know, sends a salesman out with a new style telephone, soliciting new subscribers and the installation of extensions on existing lines. This system works very well, for people always like to see what they are buying. The salesman may also demonstrate how well the new style telephone will look in various proposed or suggested locations about the house.

Some who read this will probably condemn the idea for the reason that it is something new and outside the usual traveled path. That, however, is to be expected in some cases for the beaten path after a short time should be traveled only by the beaten man.

Exchange Lines Cover Nearly 2,000 Square Miles

The Ashland, Me., exchange of the New England Telephone & Telegraph Co. serves nearly 2,000 square miles of farm and forest area.

Regularly employing three operators, the exchange serves residents from the Oxbow Flats on the south to the Plantation of Nashville on the north—over 40 miles—and from Castle Hill to Garfield in the other direction—15 miles.

On the west the thin thread of its telephone wires is a web of communication for the dozens of forest service men. Connected to the exchange are three lines leading into the forest. The foresters, isolated in cabins 50 or more miles in the woods, otherwise would be cut off entirely from civilization.

OBITUARY

EARL BENNY SMART, more familiarly known as Ben Smart, manager of the Wood County Telephone Co., Wisconsin Rapids, Wis., passed away at 5:30 a.m., January 24, at the age of 59. He was associated with the Wood County company for 41 years, starting as a night operator.

He is survived by two brothers, Donald and Guild. Funeral services were held in the Masonic Temple at Wisconsin Rapids, Friday afternoon, January 27.

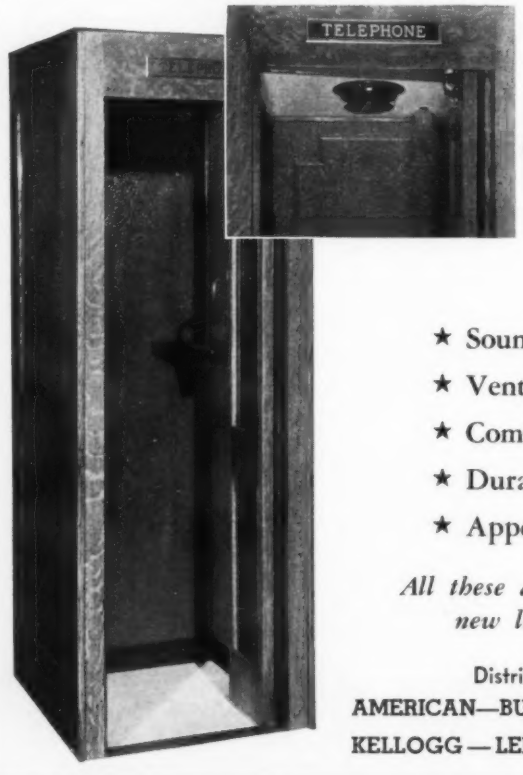
S. N. ALEXANDER, secretary and director of the Lone Tree (Iowa) Telephone Co., which he organized 35 years ago, passed away January 13, at the age of 73.

Mr. Alexander was for years a faithful member of the Iowa Independent Telephone Association and was held in high esteem by his friends and associates. Said H. B. Melick, manager of the West Liberty (Iowa) Telephone Co., in writing TELEPHONY relative to Mr. Alexander's death: "He was one of the finest persons I ever came in contact with."

For years prominently identified with the life of his community, Mr. Alexander served for 30 years as assessor of Fremont township, as secretary of the township school board and as trustee for the local bank. He was active in the discharge of these duties until his illness of the past several weeks, which resulted in his demise.

He saw to it that communication facilities were adequate to meet the needs of the community and was instrumental in the erection of a new exchange building to house the present central office equipment.

Mr. Alexander is survived by three daughters, Mrs. Louis J. Andrews of Iowa City, and Laura and Ellen of Lone Tree.



CHURCHILL TELEPHONE BOOTHS OFFER EVERY MODERN IMPROVEMENT

★ Sound Proofing
★ Ventilation
★ Comfort
★ Durability
★ Appearance

All these are yours at a new low price.

Distributed by
AMERICAN—BUNNELL—GRAYBAR
KELLOGG — LEICH — STROMBERG

Commission, Court and Legislative Activities

FCC Cooperating with National Association of Commissioners

The Federal Communications Commission has arranged to cooperate further with the National Association of Railroad and Utilities Commissioners in aiding in work of that association's committee on statistics and accounts of public utilities by having its accounting department participate in the work of reproducing the reports of the committee, particularly in matters with which the FCC is primarily concerned. The National Association's committee has been doing much work incident to the drafting of uniform systems of accounts for gas, electric, telephone and other public utilities.

▼ ▼

FCC Sub-Committee Issues Radio Report

A special committee of the Federal Communications Commission issued a report January 19 warning against licensing of "super power" broadcasting stations capable of instantly blanketing the nation with propaganda and setting forth some proposed rules governing standard broadcast stations and standards of good engineering practice.

The report was submitted to the full commission by FCC Commissioners Norman S. Case, T. A. M. Craven and George Henry Payne. The committee held exhaustive hearings last June on proposed changes in FCC rules governing broadcasting stations.

The committee said "it should not be assumed that 10 or 20 people in the United States would conspire to influence wrongfully the public opinion of the nation," but that the few persons controlling "super power" stations might be influenced greatly by their "desire for financial gain, as well as for social, economic and political power."

While conceding that rural areas receive better service from high-powered broadcasting stations, the committee advised the commission to "proceed with caution" because of the "possible social effect of permitting a relatively few persons in the United States to control the operation of a means of mass communication capable of continuous and instantaneous transmission of programs to all the people of the nation."

The committee recommended that broadcasting licenses be granted for one year instead of six months, the limitation of Class A stations to 50,000 watts, and that the commission consider certain points outlined in the report for formulating definite policies and program requirements to be followed by radio broadcasting stations.

The committee also recommended that the commission, in authorizing new stations, consider competition between the stations and established newspapers because "if such competition should be destructive and should affect employment of a relatively large number of people in a community, as well as the investment in property therein, there may be involved an element of public interest which, at least, should be considered by the commission."

Radio Station WLW, Cincinnati, is the only "super power" station in the United States, operating on 500,000 watts under special experimental authorization. No other station uses more than 50,000 watts. The committee reporting recommended previously that WLW's power be reduced.

▼ ▼

President Seeks FCC Corrective Legislation

Stating he was "thoroughly dissatisfied" with the functioning of the administrative and legal setup of the Federal Communications Commission, President Roosevelt on January 24 wrote to the chairmen of the House and Senate interstate commerce committees asking for corrective legislation. The President suggested the committees confer with Chairman Frank R. McNinch of the FCC.

"Although considerable progress has been made as a result of efforts to reorganize the work of the Federal Communications Commission under existing law," the President said in his letter, "I am thoroughly dissatisfied with the present legal framework and administrative machinery of the commission. I have come to the definite conclusion that new legislation is necessary to effectuate a satisfactory reorganization of the commission.

"New legislation is also needed to lay down clear congressional policies on the substantive side—so clear that the new administrative body will have no difficulty in interpreting or admin-

HOW

you can obtain MORE REVENUE

Potential business exists for every telephone company in almost any public place . . . hotel lobbies, drug stores, cigar stores, restaurants or in any one of a dozen other public places common in every town and city in the United States. All that is needed to obtain this extra business is a Gray Telephone Pay Station mounted in full view of the passing public.

Gray Pay Stations are standard (in fact used exclusively) throughout the telephone systems in this country and many others. Rightly so, too, for they are accurate and dependable, collecting the money at the time the service is rendered and thus providing a safeguard against fraud.

There is a model to meet the requirements of your company and locality.

GRAY TELEPHONE PAY STATION CO.

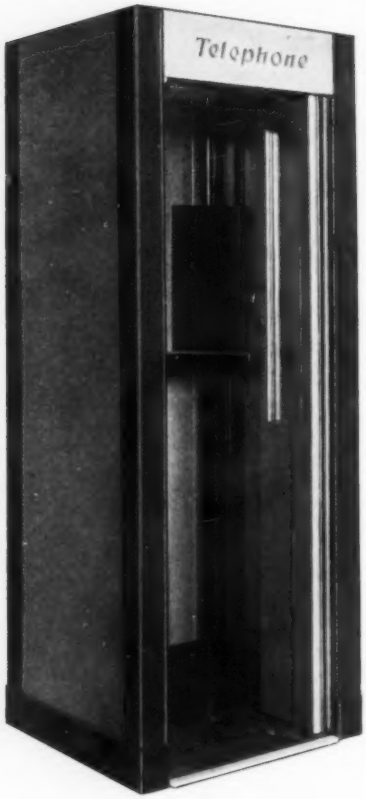
Order Direct or Through
AMERICAN AUTOMATIC ELECTRIC SALES CO., Chicago
GRAYBAR ELECTRIC CO., INC., New York, N. Y.
KELLOGG SWITCHBOARD & SUPPLY CO., Chicago
LEICH SALES CORPORATION, 222 West Adams Street, Chicago, Ill.
STROMBERG - CARLSON TELEPHONE MFG. CO., Rochester
CANADIAN TELEPHONES & SUPPLIES LIMITED, Toronto, Montreal, Winnipeg, and Vancouver
NORTHERN ELECTRIC CO., LTD., Halifax, Montreal, Toronto, Winnipeg, Regina, Calgary, Edmonton, Vancouver
Or any other telephone supply house

GRAY TELEPHONE PAY STATIONS

go modern with

STEEL

it serves and survives



A New "LOW" in COST

A New "HIGH" in REVENUE

A new booth at a low cost making available to telephone companies a high revenue never before possible. Write for descriptive circular and information.

SHERRON METALLIC CORPORATION
1201 Flushing Avenue, Brooklyn, N. Y.
National Distributors and Sales Agents
J. H. BUNNELL & COMPANY
215 Fulton Street, New York, N. Y.

istering them. I very much hope that your committee will consider the advisability of such new legislations."

Burton K. Wheeler (Dem., Mont.), chairman of the Senate interstate commerce committee, and Clarence F. Lea (Dem., Calif.), chairman of the House committee on interstate and foreign commerce, were recipients of the letter.

At his press conference January 24, President Roosevelt explained that the commission lacks a definite policy. He favors a policy that would cover such questions as network control and multiple ownership of stations. He said it should also embrace other phases of radio and telegraphic communications. The President indicated the administration will ask through Mr. McNinch for a three or five-man commission to replace the seven-man commission. He hinted he was for greater centralization of responsibility.

Company Elects Officers; To Metallicize Its Lines

Herman Peterson, of Hampton, Neb., was elected president to succeed Edwin Huenefeld, and George Kline, of Trumbull, Neb., vice-president in place of T. W. Seiver, at the annual meeting of the Hamilton County Farmers Telephone Association, whose headquarters are at Aurora, Neb. The auditor's report showed that stations had decreased 136, to 2,069 during the year, and that despite an operating income of $55,350, the company was operated at a loss of $103.

A sleet storm in April cost the company $10,000, and it is now confronted with the necessity of expending $27,000 to metallicize the lines because of rural electric line construction. In addition, drop lines to farmers will cost $6 each to metallicize. The directors were authorized to make an equitable division of this added expense.

Secretary-Manager D. D. Davis said that *if the company is compelled to conform to the wages and hours law it will be forced to do away with managers at its smaller exchanges* and substitute automatic service.

Court Dismisses Old Interlocutory Injunction

As a sequel to the order of the Ohio Public Utilities Commission entered in April, 1938, establishing rates in the Ohio Bell Telephone Co. state-wide rate case, an order was entered January 21 in the federal district court at Columbus under which a three-judge court dismissed an interlocutory injunction granted the telephone company in 1926.

The Ohio Bell Telephone Co. obtained the original injunction to restrain the commission from charging a certain rate in Canton, Ohio, after the old Ohio Bell and state telephone services were unified.

After the injunction was issued and in subsequent litigation which was concluded in the order of the commission last April, all questions involved were settled excepting disposal of the injunction in federal court.

Restrain Pennsylvania Anti-Gambling Law Enforcement

The Dauphin County Court in Pennsylvania has restrained the Pennsylvania Public Utility Commission from enforcing the recently-enacted anti-gambling law with respect to leased wire contracts between the Bell Telephone Co. of Pennsylvania and 21 radio stations. Further litigation is pending, the radio stations taking the position that a statute which seeks to make the dissemination of public information a criminal act is unconstitutional.

Kenton (Ohio) Company's Depreciation Reserve

An order issued January 18 by the Ohio Public Utilities Commission authorized the Kenton (Ohio) Telephone Co. as of June 30, 1938, to transfer to its depreciation reserve account the balance of $2,997.80 in a special insurance reserve account and $18,323.13 in a surplus account.

In disposition of a further plan to establish a depreciation rule fixing approximately 4½ per cent in book value of its depreciable property, the commission ordered the company, effective as of July 1, 1938, and until further order, to appropriate annually out of its revenue to a depreciation reserve account a sum not less than 5 per cent of the book value of the depreciable property.

Property Overassessed Claims Bell in Suit

Charging that the North Dakota Board of Equalization has ignored all legal methods of assessing its property and that the board has continually grossly overassessed its property despite protests, the Northwestern Bell Telephone Co. has begun action in federal court to restrain collection of its 1938 tax in 51 North Dakota counties. Dickey and McIntosh counties are not affected.

The action is brought against all members of the board of equalization, which includes Gov. William Langer, Berta

E. Baker, state treasurer, John Hagan, commissioner of agriculture and labor, and Owen T. Owen, tax commissioner, as well as the state auditor and treasurer in each of the 51 counties in which the company has property.

The company charges "that for many years last past the state board of equalization, in fixing the assessments of the plaintiff's property, has totally ignored the actual value of said property and has systematically, fraudulently and with full knowledge of the true and actual value of plaintiff's property, fixed assessments in amounts grossly exceeding the true and actual values of said property."

It is contended that although the net operating income of the company for the years 1931 to 1937 has been consistently less by one-half than the average net operating income in the years 1929 and 1930 and that although the annual depreciation on plaintiff's properties over the same period has exceeded in amount the additions and betterments, nevertheless the state board assessed the property in 1938 at $1,105,-035 higher than the 1931 assessment.

The company contends that the highest figure at which its property could legally be assessed for 1938 is $4,352,-454. The state board fixed a tentative assessment at $5,905,000 and, despite protests of the company at the time set for hearing, assessed the property at that figure.

The 1938 assessment is an increase of $495,448 over the 1937 assessment, which in turn was $507,340 higher than the 1936 assessment, whereas it is contended that value of the company's property this year is lower than in 1936.

The plaintiff shows that in 1929 the net operating income was $474,757 and the assessment for 1930 was $4,458,840, while in 1937 the net operating income was $219,457 and the assessment for 1938 was $5,905,000.

In event that final determination of the case cannot be had prior to March 1, 1939, at which time the tax becomes delinquent, the company offers to pay a proportionate share of the tax to be set by the court.

Fails to State Cause of Action

The U. S. Circuit Court of Appeals, First Circuit, on November 8, affirmed with costs the judgment of the Massachusetts federal district court in the case of Fuller vs. the American Telephone & Telegraph Co.

The court held that the complaint in action against the telephone company by the wife of a company employe failed to state concisely and with substantial certainty a cause of action, either on the ground of conceit or negligence, where it alleged that the company misinformed the plaintiff as to the true nature of injuries received by her husband while performing his duties.

Ordered to Adopt Uniform Extension Rules

To facilitate extension of telephone service to farms, the Commonwealth Telephone Co. has been ordered to adopt uniform extension rules at its 110 exchanges, the Wisconsin Public Service Commission stated January 7.

New extension rules will include the provision that the company will extend its lines one-half mile to serve a new customer. Extension of more than one-half mile will be paid for by the customer to be served. If additional customers are added to extensions paid for

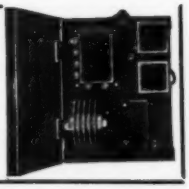
Consulting Telephone Engineer
"Modernization of Equipment and Methods for Improved Service"
GARRISON BABCOCK
1104 Third Avenue, Seattle, Washington

J. W. WOPAT
Consulting Engineer
Telephone Engineering
Construction Supervision
Appraisals—Financial
Rate Investigations
303 East Berry St. Fort Wayne, Indiana

Frank F. Fowle & Co.
Electrical and Mechanical ENGINEERS
35 East Wacker Drive CHICAGO

COFFEY SYSTEM
Exclusive Telephone Accountants
Accounting Forms for All Classes Telephone Companies
CENTRAL ACCOUNTING DEPARTMENT
Lemcke Bldg., Indianapolis

SLOAN & COOK
CONSULTING ENGINEERS
120 SOUTH LA SALLE STREET
CHICAGO
Appraisals—Original Cost Studies
Depreciation, Financial, and Other Investigations

NOW—ELECTROX
Current Supply Unit for operator's sets at a new low price—$14.85. No batteries needed.
Sent on Trial
Schauer Machine Co.
2060-2068 Reading Road
Cincinnati, Ohio


HIGHWAY

"EVERYTHING YOU NEED IN A LIGHT BODY—

"— at surprisingly LOW PRICES!"

Highway LI Body

The Highway Type LI Body was primarily designed for installation work but is used for many service jobs.

Bodies are made of rust-resisting metal with completely equipped interiors including trays, drawers and compartments to carry materials and tools used in all types of service work.

It has everything a small or large exchange needs in a light body and is available at a surprisingly low price.

The Highway Type SL Body is known as a sectionman's or combinationman's service body and is admirably adapted to all of the various types of service in and around small exchanges.

Bodies designed by telephone engineers. Every single detail is the result of years of study of telephone company requirements. We invite your inquiry for further details and prices.

HIGHWAY TRAILER CO.
EDGERTON WISCONSIN

COOK

UX Underground Unprotected Cable Terminal

Choose the UX Terminal for subscribers' drops placed underground and terminated in a manhole or handhole. The UX provides a moisture-proof connection to the lateral cable.

TERMINAL AND PROTECTION EQUIPMENT

COOK

COOK ELECTRIC CO., 2700 SOUTHPORT AVE., CHICAGO

RAY-O-VAC COMPANY

Formerly FRENCH BATTERY CO.

MADISON - WISCONSIN

by subscribers, a refund plan will go into effect.

"If telephone companies serving small communities in rural areas are to remain in business they must lend every effort to place service in reach of the farmer by use of lower construction costs and improvement of service," the commission said.

"Telephone service involves communication between two parties, both of whom usually benefit and should share in the cost. Several significant considerations must be taken into account in prescribing rural extension policies:

"There is an important interdependence between rural and city subscribers. A call between a rural and a city subscriber is often more valuable than a call between two city subscribers because of distance."

Summary of Commission Rulings and Hearings

Federal Communications Commission
Washington, D. C.

January 12: The Southern Bell Telephone & Telegraph Co. was granted authority to supplement existing facilities between Leland and Hollandale, Miss., a distance of 17.1 miles, by stringing two .104 copper wires on an existing pole line of the applicant between these points and to supplement existing facilities between Thomasville, Ga., and Monticello, Fla., a distance of 24.21 miles, by stringing two pairs of .104 copper wires on its existing pole line between these points.

January 18: The Ohio Bell Telephone Co. was granted authority to supplement existing facilities between Steubenville and Bridgeport, Ohio, a distance of 24.7 miles.

January 18: The American Telephone & Telegraph Co. and the Southern New England Telephone Co. were granted authority to supplement existing facilities between New London, Conn., and Westerly, R. I., a distance of approximately 14.5 miles.

Michigan Public Utilities Commission

December 29: Order issued authorizing the Union Telephone Co., Owosso, to issue and sell its seven-year 5 per cent notes in the sum of $420,000.

January 10: The Michigan Bell Telephone Co. was authorized to establish a Detroit district telephone exchange consisting of Detroit and 10 adjacent suburbs and to institute therein a revised and reduced schedule of charges for calls between the included suburbs and seven newly-established zones within the present Detroit exchange.

The commission further ordered the offering of extended area service to be available to all suburbs within the district exchange and fixed rates therefor.

February 15: Hearing in Lansing on joint application of the Michigan Bell Telephone Co. and of the Mutual Telephone Co., Copemish, for authority to the former to sell certain telephone property to the latter, and for the former to lease certain telephone property to the latter.

February 15: Hearing in Lansing on joint application of the Michigan Associated Telephone Co., with headquarters at Muskegon, for authority to sell and of the Michigan Bell Telephone Co. to purchase certain telephone property.

Nebraska State Railway Commission

January 19: Approval granted application of the Craig Telephone Co., of Craig, for authority to continue for another year the reduced schedule of rates for service and installation and connection charges in effect in past years because of economic conditions.

New York Public Service Commission

January 23: Hearing in New York before Chairman Maltbie on petition of the Fishers Island Telephone Corp. for a certificate to construct a telephone line in the town of Southold, Suffolk county.

January 23: Hearing in New York on joint petition of the Fishers Island Farms, Inc., and the Fishers Island Corp. for permission to sell and transfer all telephone and telegraph systems owned by these corporations to the Fishers Island Telephone Corp.; to acquire stock of the Fishers Island Telephone Corp. and of the latter corporation to issue stock.

January 27: Hearing in Albany before Commissioner Brewster in the commission's investigation of the toll rates and charges of the New York Telephone Co.; Rochester Telephone Corp., Rochester; the Orange County Telephone Co., Middletown; Upstate Telephone Corp. of New York, Johnstown; Jamestown Telephone Corp., Jamestown; and Chenango & Unadilla Telephone Corp.

Ohio Public Utilities Commission

January 17: After overruling pro-

(Please turn to page 34)

POLES

B. J. Carney & Co., 100 N. 7th St., Minneapolis, Minn.—Western red cedar poles. Pentrex Butt Treated or Plain.

International Creosoting and Construction Co., Galveston, Texas.—Creosoted Southern Yellow Pine Poles. Plants: Beaumont and Texarkana, Texas.

MacGillis & Gibbs Company, Milwaukee, Wis.—Northern White and Western Red Cedar Poles. Plain or butt-treated. Immediate quotations on request.

NELSON CREOSOTING COMPANY
Panama, Oklahoma

CREOSOTED PINE POLES

WOOD PINS BRACKETS

CROSS ARMS
CREOSOTED AND PLAIN

T. M. Partridge Lumber Co., Minneapolis, Minn.—Northern White—Western Red Cedar Poles. Plain or butt-treated.

Valentine Clark Corporation, 2516 Doswell Ave., St. Paul, Minn.—Finishd Cedar Poles. Plain or butt-treated.

Western Red Cedar Company, P. O. Box 663, Sandpoint, Idaho.—Plain or butt treated Western Red Cedar poles.

Modern Building Houses New Exchange Equipment

WINDOWLESS BUILDING, embodying some of the latest developments in building construction, houses new central office equipment installed in city of Logansport, Ind. Initial installation consists of 2,400 lines. Among unique features of installation is location of cable vault on roof of building. Many inspect building and equipment during recent "open house"

Modern business office at Logansport, Ind., with daylight entering through glass brick, and artificial light provided by a modern lighting system.

THE RECENT cutting into service of the new 2,400-line Strowger automatic telephone exchange of the Indiana Associated Telephone Co. at Logansport, Ind., marked completion of a comprehensive rehabilitation program which included the construction of a three-story exchange and office building that is ultra modern in design. Thus the telephone needs of this progressive commercial city of some 20,000 population on the banks of the Wabash River have been adequately provided for.

The new Logansport exchange building is an air-conditioned, windowless structure, large glass brick being used extensively to provide a light without dust or dampness—important factors in the efficient and economical operation of telephone equipment. Proper ventilation is assured throughout the building by a forced air circulating system, with provisions for cooling as well as heating. Air is filtered before it is allowed to enter the building and a uniform temperature is maintained.

This modern exchange building was designed by Walter Scholer, of Lafayette, Ind., and erected by the Chrisman Construction Co., of South Bend. Constructed of steel, concrete, brick and glass, it is attracting nation-wide attention among builders and telephone company executives.

The cable vault has a unique location —on the roof of the building, directly over the distributing frame. It was found that considerable money could be saved by carrying the paper-covered cables up to the roof and dropping short terminating cables to the distributing frame below—on the third floor where the exchange is located—instead of running textile insulated cables directly from a basement cable vault.

The Automatic Electric Co., of Chicago, built and installed the 2,400-line Strowger automatic exchange in Logansport's new exchange building, using 200-point line finders. The standard services offered by the new exchange on a full automatic basis include individual, two-party, four-party, five-party, ten-party, consecutive number (P.B.X.) and pay station service.

Connectors of the 100-line type are provided to serve individual and 10-party lines and connectors of the 200-line type to serve two, four and five-party lines. The minor switch on each connector selects not only the harmonic frequency but also the proper 100-line group.

Full selective ringing on party lines, with bridged or grounded ringers, is provided by means of five-frequency harmonic converters. For the automatic completion of calls between two parties on the same line, "reverting call" facilities are provided. With the exception of 10-party lines which require five digits, telephone numbers are all of four digits.

The toll board of the Indiana Bell Telephone Co., through which toll and long distance connections are provided for Logansport subscribers, is located in the new Logansport exchange building. The calling party dials "10" to reach the toll operator. When this dialing lights a lamp on the toll board, the calling party receives a "ring-back"

Workmen are given easy access to equipment on the selector rack in the new Strowger automatic exchange at Logansport, Ind., by means of rolling ladders.

tone, as an indication that a toll operator is being signaled.

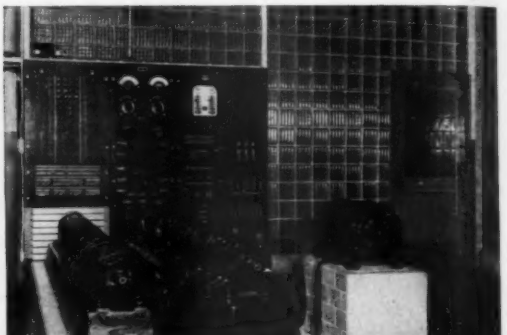
When a toll call is originated from a line on which toll service is to be denied unless approval is given by a supervisor, a "splash" of tone is heard by the operator.

For incoming toll calls and delayed

Line finders and relay rack in the new Logansport, Ind., Strowger automatic telephone exchange. →

Glass brick panels furnish daytime illumination in the new Logansport exchange building, which is thoroughly air-conditioned and embodies new construction features. ↓

Power board, charging machine and ringing converters installed in the Logansport (Ind.) exchange, in a modern setting with a glass-brick wall for a background. ↓



outgoing calls a special train of switches is used. Connection through these switches is secured by the operator by dialing the regular directory number. The operator controls the ringing so that on delayed calls she may establish local connections and proceed to complete the connection at the distant end before recalling the local party originating the call.

A flashing "busy" signal is provided for the operator by the toll train when an incoming call is attempted to a busy line. There is also included a coin-control feature which is required on delayed outgoing calls from telephone pay stations.

Through one-way "pulse correcting" repeaters and the regular line equipment calls from four outlying magneto exchanges—Walton, Galveston, Young America and Lucerne—are handled automatically. Operators at the magneto exchanges dial regular directory numbers and receive disconnect supervision when the called party replaces his receiver.

For the distribution of incoming cabling and cabling between switch groups there is provided a combined main, line and trunk intermediate distributing frame of 23 uprights. The frame is of the "B" type and is equipped initially with 4,848 pairs of protectors.

Comprising the power equipment for the new Logansport exchange is a storage battery with CEMF cells, a 12-ampere tube-type rectifier, a motor-generator set, an engine generator set for emergency use and two sets of ringing generators—one arranged to operate from 110-volt alternating current and the other from the exchange battery.

Other miscellaneous and accessory equipment in the exchange includes toll and test racks, a one-position repair clerk's desk, a two-position information desk and a new and simplified type of intercepting equipment. By means of the latter equipment calls to dead levels, unassigned numbers and changed numbers are automatically routed directly to the information operators.

Rolling ladders provide easy access to the Strowger automatic switches which are mounted on one-sided frames, 11 ft., 8 ins. high.

Supplementing the main lighting system, which includes special ceiling units of modern design, is an auxiliary emergency lighting system for operation on the 48-volt exchange supply in the event of failure of the commercial current supply. By means of Automatic Electric relays these lights are automatically switched into service when an emergency arises.

Shortly after the cutover of the new automatic exchange in Logansport, the public was invited to inspect the new building and equipment at an open house celebration. Wilbur Van Horn, local manager, officiated as host on the occasion. Other company officials present included Frank O. Cuppy, vice-president and general manager, of Lafayette, who directed the installation of the central office equipment, and Walter Dakin, general plant superintendent, of Madison, Wis.

Visitors exclaimed with pleasure over the beauty of the interior of the exchange building, with its walls and partitions of glass brick, its attractive fittings and modern lighting, its doorless telephone booths, lined with sound absorbent material. They were fascinat-

ed with the switching equipment and listened with closest attention when guides endeavored to explain to them some of the mysteries of its operation.

In the lobby the visitors gathered about a bronze plaque commemorating the life of a telephone man who devoted the greater part of his life to the communication problems of the growing city of Logansport—Walter J. Uhl. The tribute engraved on this plaque reads as follows:

"Walter J. Uhl, 1867-1937.

This organization pays tribute to one who organized Independent telephony in Logansport and faithfully served it for 36 years, 1901-1937."

Mr. Uhl passed away September 29, 1937, after the construction program which he helped to plan was under way, but he did not live to see the fruition of his hopes and dreams—a beautiful and modern exchange building housing Strowger automatic machine switching equipment.

▼ ▼

Bell's 1939 Construction Budget of $350,000,000

The 1939 construction budget of the Bell System is expected to total between $325,000,000 and $350,000,000, on the basis of reasonably good business, according to a recent news dispatch. The Bell System operates approximately 15,725,000 telephones.

Last year the Bell System expended slightly less than $300,000,000 for new equipment and plant additions, as compared with $633,000,000 during the peak construction year of 1929 and $164,000,000 for the low-point in 1933.

▼ ▼

Telephones on Pacific Coast 40 Years Ago

In 1899 there were only 47,874 telephones in the entire Pacific Coast region including California, Oregon and Washington. Today there are more than 2,500,000, with 850,000 in Southern California alone. This and other interesting data was discovered recently by H. J. Isaacs, vice-president of Weaver-Jackson Co., Los Angeles, Cal., who, in rummaging through the basement of the company's executive offices, uncovered a telephone directory more than 40 years old.

The book reveals that Long Beach, which now has more than 40,000 telephones, then (in 1899) had exactly 38, including those in grammar and high schools, but, strangely enough, none in either the fire or police station.

Detailed instructions on how to use the telephone including translation into Chinese indicate the large Oriental population then in California. The book, which contained the numbers of all telephones on the Pacific Coast, revealed another interesting fact in the comparative sizes and subsequent growth of San Francisco and Los Angeles, the two great rival cities of the state. San Francisco then led the state with 151 pages of the directory while Los Angeles was a poor second with only 45 pages. Today Los Angeles leads with a directory containing 1,048 pages, each page holding four times as many names as those in the 1899 directory.

Prefixes then ran to colors with the exception of Main, the standby of all directories. Hollywood had one telephone and the now important city of Glendale but two. Three Finger Jack was listed in the San Francisco book, and the Star saloon in Lewistown, Idaho, was Main 1. In San Bernardino, when a subscriber desired to report a fire, he called Central and gave the location, after which Central called the fire department—by which time the building was usually in ashes.

Answers to Traffic Questions on Page 23

1. No.
2. Try to pacify your subscriber and take the necessary action to get his call through. If necessary, call the toll center supervisor or chief operator and explain the difficulty and solicit her cooperation.
3. Try to find out which one is desired by questioning the calling party, saying, for example: "We have two J. R. Hill's. Which one do you wish, please?" However, if considerable delay is encountered in securing the necessary information, and other signals are standing, secure the assistance of your supervisor or chief operator.
4. Please refer to the preface of this series.
5. If you do not receive a report and the called station has not answered a minute and a half from the time your order was acknowledged, ring the distant operator and say, "Is the number DA?"

HEMINGRAY Glass INSULATORS

For a long life of dependable low-cost service rely on Hemingray Pin-Type Glass insulators.

No aging or deterioration . . . unaffected by sudden temperature changes . . . interval strains and stresses removed . . . homogeneous in character, only one coefficient of expansion . . . sustained high dielectric strength . . . clear, flawless for easy inspection . . . all surfaces impervious to moisture . . . tougher, improved glass to withstand rough handling. Write us about your requirements. We'll gladly send samples.

Owens-Illinois Glass Company, Muncie, Indiana.